

HORTICULTURAL ABSTRACTS

INDEX TO
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1950



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SUMMARY OF CONTENTS

AUTHOR INDEX	- - - - -	<i>Pages</i> III
SUBJECT INDEX	- - - - -	XXVI
PUBLICATIONS EXAMINED	- - - - -	XCII
MISCELLANEOUS	- - - - -	3, 74, 176, 306
TREE FRUITS, DECIDUOUS	- - - - -	9, 79, 186, 323
SMALL FRUITS, VINES AND NUTS	- - - - -	17, 88, 197, 335
PLANT PROTECTION OF DECIDUOUS FRUITS	- - - - -	19, 93, 203, 343
WEEDS AND WEED CONTROL	- - - - -	28, 107, 221, 369
VEGETABLES AND MISCELLANEOUS TEMPERATE CROPS	- - - - -	34, 110, 224, 375
FLORICULTURE	- - - - -	47, 131, 251, 418
SUB-TROPICAL CROPS	- - - - -	51, 134, 259, 423
TROPICAL CROPS	- - - - -	54, 143, 270, 436
STORAGE AND PLANT PRODUCTS	- - - - -	61, 155, 285, 460
NOTES ON BOOKS AND REPORTS	- - - - -	63, 159, 289, 463

NOTICE TO USERS OF THIS AND OTHER YEARLY INDEXES

The yearly index is prepared under pressure, its aim being immediate presentation of information.

COMMONWEALTH BUREAU OF HORTICULTURE AND PLANTATION CROPS

SCIENTIFIC STAFF, JANUARY, 1950

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HORTICULTURAL ABSTRACTS

Date of publication

Past experience forbids such optimism as would guarantee future punctuality of publication. Nevertheless, a determined effort, in which the full co-operation of the printer is assured, will be made as from the present number to publish in March, June, September and December as stated on the cover.

The loss, on promotion, of one member of staff, the illness of a second, and the decision to publish on time are responsible for the thinness of the present number.

Subject matter of abstracts

Horticultural Abstracts, first published in 1931, is the quarterly journal of the Commonwealth Bureau of Horticulture and Plantation Crops, the main purpose of which is to make known throughout the British Commonwealth the progress of research in those subjects. The abstracts are prepared from current and recent literature published in every part of the world in many languages.

The Bureau's primary concern is with horticultural and plantation crops and the application of science to them. It deals also with certain crops difficult to classify, such as potatoes, tobacco and a number of minor crops.

For the purposes of this journal horticultural crops include all those whose products normally appear as fruits, vegetables, nuts and flowers, while all tropical and sub-tropical perennials, such as tea, rubber, oil palm, sugar cane, etc., are considered to be plantation crops.

The storage and preservation of the products from the above crops are covered, in so far as they are the direct concern of the grower. For details of processing, Food Science Abstracts, issued by the D.S.I.R., and obtainable from H.M. Stationery Office, London, 6s. a number or annual subscription £2, should be consulted.

Each volume is fully indexed. There are also cumulative indexes for Vols. 1-10 and Vols. 11-15.

Availability

Copies printed on one side only can be obtained—see p. iii of cover.

HORTICULTURAL ABSTRACTS

Vol. XX

March 1950

No. 1

Initialled abstracts and reviews, not by Bureau staff, are by D. W. P. Greenham and H. B. S. Montgomery of the East Malling Research Station, by staff of the Obstbauversuchsring, Jork, Germany [O.J.], by G. K. Argles and by G. St. C. Feilden.

INDEX OF CONTENTS.

			Nos.				Nos.
MISCELLANEOUS	Abstr. 47.	Noted 11	1-48k	VEGETABLE AND MISCELLANEOUS TEMPERATE CROPS	Abstr. 101.	Noted 24	242-343x
General	..	..	1-2	General	..	..	242-244
Growth phenomena	..	..	3-6	Garden vegetables	..	..	245-302
Photoperiodism	..	..	7-10	Mushrooms	..	..	303-306
Growth substances	..	..	11-18	Potatoes	..	..	307-320
Propagation	..	..	19-23	Tobacco	..	..	321-326
Nutrition and nutrients	..	..	24-34	Hops	..	..	327-331
Practical technique	..	..	35-44	Herbs	..	..	332-335
Glasshouses	..	..	45-47	Other crops of commercial interest	..	..	336-342
Noted	..	..	48a-48k	Noted	..	..	343a-343x
TREE FRUITS, DECIDUOUS	Abstr. 51.	Noted 5	49-100e	FLORICULTURE	Abstr. 30.	Noted 11	344-374k
General	..	..	49-60	General	..	..	344-353
Breeding	..	..	61	Bulbs, tubers, etc.	..	..	354-362
Root growth	..	..	62	Roses	..	..	363-370
Rootstocks and propagation	..	..	63-77	Shrubs	..	..	371-373
Pollination and bees	..	..	78-79	Noted	..	..	374a-374k
Growth and nutrition	..	..	80-85	SUB-TROPICAL CROPS	Abstr. 20.	Noted 1	375-395a
Pruning and training	..	..	86-88	Citrus	..	..	375-387
Manurial and soil problems	..	..	89-95	Avocado	..	..	388
Other cultural operations	..	..	96-98	Sweet potato	..	..	389-392
Grading	..	..	99	Tung	..	..	393-394
Noted	..	..	100a-100e	Noted	..	..	395a
SMALL FRUITS, VINES AND NUTS	Abstr. 18.	Noted 3	101-119c	TROPICAL CROPS	Abstr. 39.	Noted 7	396-435g
Small fruits	..	..	101-109	General	..	..	396-398
Vines	..	..	110-115	Cacao	..	..	399-400
Nuts	..	..	116-118	Coconuts	..	..	401
Noted	..	..	119a-119c	Coffee	..	..	402-403
PLANT PROTECTION OF DECIDUOUS FRUITS	Abstr. 78.	Noted 11	120-198k	Fibres	..	..	404-405
Nutritional disturbances	..	..	120-126	Fruits	..	..	406-411
Climatic factors	..	..	127-132	Oil palm	..	..	412-413
Virus diseases	..	..	133-137	Rubber	..	..	414-426
Bacteria	..	..	138-142	Sugar cane	..	..	427-428
Fungi	..	..	143-151	Tea	..	..	429-431
Mite and insect pests	..	..	152-179	Sundry	..	..	432-434
Snails	..	..	180	Noted	..	..	435a-435g
Sprays and spraying	..	..	181-186	STORAGE AND PLANT PRODUCTS	Abstr. 21.	Noted 5	436-457e
Fungicides	..	..	187	Storage	..	..	436-450
Pest control	..	..	188-197	Plant products	..	..	451-456
Noted	..	..	198a-198k	Noted	..	..	457a-457e
WEEDS AND WEED CONTROL	Abstr. 42.	Noted 8	199-241h	NOTES ON BOOKS AND REPORTS	Abstr. 36.	Noted 10	458-494j
Particular weeds	..	..	199-203	Books and Reports	..	..	458-493
Herbicides and their action	..	..	204-213	Noted	..	..	494a-494j
Weed control in vegetables	..	..	214-225	Total Abstracts 483.	Noted 96.		
Weed control in strawberries	..	..	226-228				
Weed control in ornamentals	..	..	229-231				
Weed control in tropical crops	..	..	232-240				
Noted	..	..	241a-241h				

N.B.—Numbers sub-divided alphabetically refer to items noted but not abstracted.

General.

1. ZAPPE, M. P.

Laws and regulations concerning the inspection of nurseries in Connecticut and transportation of nursery stock.

Circ. Conn. agric. Exp. Stat. 163, 1946, pp. 41 [received 1949].

Regulations in force [in 1946] in individual states of the U.S.A. are briefly noted and the names and official status of the officers in charge of inspection and quarantine service in the different states are listed.

2. OPPENHEIMER, H. R.

Sand, swamp and weed vegetation at the estuary of the Rubin River (Palestine).

Vegetatio, 1949 [issued 1949], 1: 155-74.

A survey of the vegetation at the El Qbeibah farm of the Agricultural Research Institute, Rehovot, and its immediate neighbourhood. Very little cultivation had ever taken place here, and the survey was usefully undertaken to provide for future generations some account of a flora destined to destruction in favour of the nutritional requirements of a growing population and agricultural progress. The plants are listed with notes under their natural orders.

Growth phenomena.

3. LEWIS, D.

Incompatibility in flowering plants.

Biol. Rev., 1949, 24: 472-96, bibl. 95, illus.

A genetical account of the mechanism of heteromorphic and homomorphic incompatibility.—John Innes Hort. Inst., Bayfordbury.

4. SACHS, L.

"Vegetative hybridization."

Nature, 1949, 164: 1009-10, bibl. 3.

Sachs, at the Plant Breeding Institute, Cambridge, repeating the experiments of Avakjan and Jastreb, grafted the tomato variety Golden Sunrise with ordinary leaves and yellow fruit on Open Air Wonder, a variety with potato-type leaves and red fruit, and *vice versa*. "The results of this experiment clearly show that in the year of grafting there has been no observable influence on fruit colour or leaf-shape by either stock or scion. These results, therefore, do not support the claims of the Russian workers." In plants of both varieties the first 2 or 4 leaves of some lateral branches were found to differ in shape from those formed later. Perhaps, in the absence of ungrafted controls, this type of variation might have suggested a vegetative hybrid according to Lysenko's interpretation.—School of Agriculture, Cambridge.

5. ZIRKLE, C.

The theoretical basis of Michurinian genetics.

J. Hered., 1949, 40: 277-8.*

A few notes are given on the 700-word English abstract of Dr. Karel Hruby's article in *Vesmir*, 1948-49, G.5-6, pages 82-86, on the so-called Mičurin's genetical theories. The abstract is reproduced in full. The theories disclosed in it are described by Zirkle as a "melange of archaic fallacies".

* Vol. 40, No. 10 of October, 1949.

6. JOHNSON, J.

Water-congestion in plants in relation to disease.

Res. Bull. Wis. agric. Exp. Stat. 160, 1947, pp. 35, bibl. 20, illus. [received 1949].

Any liquid water present in the intercellular spaces of a plant can be regarded as excessive and is termed congestive-water. Water-congestion predisposes plants to infection by bacteria and fungi. The diseases most intensively investigated in the work at Madison were wildfire and blackfire of tobacco, anthracnose of bean, late blight of tomato and potato and certain others. The trials were conducted for the most part under greenhouse conditions, where the host appears to develop its maximum defences against water-congestion and infection. Outdoor exposure during spring and autumn greatly increased the predisposition of many plants to water-congestion and infection. Other factors contributing directly or indirectly to water-congestion include potash content of soil and plant; physical character of soil; relative soil and air temperatures; soil, atmospheric and plant-surface moisture; and genetic sensitivity of plant species, variety or strain. The degree of water-congestion may vary greatly and be measured in different ways. Congestive-water appears to be specifically and vitally concerned with host-predisposition and relative susceptibility to disease in most cases investigated. There is great variability in sensitivity and response of different plant species to conditions favouring water-congestion. Its occurrence under natural conditions and its bearing on epidemiology of disease are briefly discussed. The importance of the investigations as affecting methods of disease control, including selection for disease resistance, is illustrated.

Photoperiodism.

(See also 273, 295.)

7. Roodenburg, J. W. M.

Nieuwe resultaten met toepassing van kunstmatige belichting. (New results with artificial light.) [English summary ½ p.]

Meded. Dir. Tuinb., 1949, 12: 490-505, bibl. 25, illus.

In growing plants with the help of artificial light, four distinct methods can be used. In order of the increase in the quantity of light required these are: prolonging the length of day, forcing, increase of carbon dioxide assimilation, and cultivation in artificial light only. The cheapest light-source with suitable properties has been found in high pressure mercury vapour lamps, of which the type of 450 Watts nominal has proved to be suitable for replacing the former Neon-plant-irradiators of similar capacity. The effect of daylength on certain ornamental plants is illustrated. The influence of low temperatures necessary for flower bud initiation in relation to a subsequent acceleration of blossoming by artificial light is discussed for *Phyllocactus* and *Cineraria*.

8. Roodenburg, J. W. M.

De hogedruk kwiklamp als plantenbestraler. (The high pressure mercury lamp for plant illumination.)

Tuinbouw, 1949, 4: 189, illus.

A short account of raising seedlings under artificial light, with an illustration showing the difference between control kalanchoë plants and plants subjected to 8 hours artificial light per night for 3 months during winter.

9. KLEŠNIN, A. F.

The formative action of the different regions of the physiological radiation spectrum on plants. [Russian.]

Doklady Akad. Nauk S.S.S.R., 1949, **67**: 569-71, bibl. 6.

In experiments on radish, turnip, and onion using orange-red, green, and blue lamps the most active region of physiological radiation was orange-red, the least active green.

10. ROTTA, H.

Untersuchungen über tagesperiodische Vorgänge in Spross- und Wurzelvegetationspunkten. (Investigations on the diurnal rhythm of processes in the growing points of shoots and roots.)

Planta, 1949, **37**: 399-412, bibl. 30.

The experiments were carried out with broad beans and tomato plants at Tübingen University. Roots growing in water at a constant temperature did not show any diurnal periodicity of metabolic or developmental processes, either in complete darkness or in a 12-hourly rhythm of light and darkness, as concluded from the absence of changes in the conductivity of the water. Neither was the rate of growth and of mitosis in the growing points affected by the photoperiod. The rate of mitosis of growing points of shoots kept in the dark showed, however, a distinct periodicity, the curve rising to a steep peak between midnight and 3 a.m. It is suggested that the presence of plastids is a necessary condition of diurnal periodicity.

Growth substances.

(See also 48k, 76, 203-241h, 277, 280, 292, 293, 364, 382.)

11. HEMPHILL, D. D.

The effects of plant growth regulating substances on flower bud development and fruit set.

Res. Bull. Mo. agric. Exp. Stat. **434**, 1949, pp. 56, bibl. 104.

A review of the literature is followed by an account of trials in which tomatoes and vines were sprayed with 3 different growth substances (α -naphthaleneacetic acid (NA), β -naphthoxyacetic acid (NOA) or *p*-chlorophenoxyacetic acid (CIPA)) at different stages close to anthesis, and the results observed. With all chemicals (NA 20 p.p.m., NOA 50 p.p.m. and CIPA 10 p.p.m.) pre-anthesis treatment of greenhouse tomatoes resulted in a reduced set of fruits, most of which were seedless and ill formed. Treatment at anthesis resulted in increased set of fruit which was seedless or only partly seeded. Average size of fruit was increased by NOA and CIPA and decreased by NA treatment. Spraying 4 days after anthesis resulted in the greatest yields, most fruits being normally seeded. The application of any one of NA 10 p.p.m., NOA 25 p.p.m. or CIPA 10 p.p.m. sprays to Concord grape flowers prior to, or at, anthesis markedly reduced set. Post-anthesis

sprays did not materially affect yield of fruit. CIPA tended to increase, and NA to decrease, berry size. Tomato flower development was retarded by CIPA treatment (10 p.p.m.) 8 and 4 days before anthesis. Histological effects are discussed. Spraying with this substance 4 days after anthesis did not materially affect seed development, but spraying with NA (40 p.p.m.), or CIPA (20 p.p.m.) at the same stage, caused most of the fruits to be wholly or partly seedless. The rate of metabolism of flower buds, as indicated by catalase activity, was depressed by the application of NA (20 p.p.m.) and CIPA (10 p.p.m.) 8 days before anthesis, but NOA (50 p.p.m.) applied at this stage did not reduce catalase activity. When applied to fully open flowers all three stimulated activity. The mechanism of retardation in flower development and the probable causes of ill effects of growth substances with particular reference to the mechanism are considered.

12. VAN KOOT, Y.

De beïnvloeding van de vruchtzetting door toepassing van groeistoffen. (Influencing fruit-set by the use of hormones.) [English summary $\frac{1}{3}$ p.]

Meded. Dir. Tuinb., 1949, **12**: 516-27, bibl. 23, illus.

The application of hormones may be advisable under the following circumstances:—unsatisfactory pollination due to unfavourable weather; lack of opportunity for the pollen to penetrate into the style; frost damage after fertilization; excessive vegetative development; sometimes deficient carbon dioxide assimilation (lack of light). Many fruit promoting hormones are known. Some of those which contain chlorine are most effective but are also most liable to cause damage. The possibility of applying hormones to tomatoes, Spanish pepper, egg plants, melons, cucumbers, strawberries, grapes, stone fruits, pome fruits and holly is reviewed.

13. SCHEERLINCK, H.

Het stekken van tuinbouwgewassen en de synthetische groeistoffen. (Cuttings of horticultural plants and synthetic growth substances.)

Landb. Tijdsch., 1949, **2**: 803-7.

An abstract review of "Le bouturage et les substances de croissance synthétique" by E. J. B. Verleyen; it gives a concise account of the subject [see H.A., 19: 702].

14. FREELAND, R. O.

Effects of growth substances on photosynthesis.

Plant Physiol., 1949, **24**: 621-8, bibl. 8.

The effects of 5 growth substances upon apparent photosynthesis and respiration in bean plants (*Phaseolus vulgaris* var. Stringless Greenpod) were determined. The growth substances used were the acids of 2,4-dichlorophenoxyacetic, indole-3-acetic, gamma(indole-3)-n-butyric, beta-naphthoxyacetic and para-chlorophenoxyacetic, each applied as a mist spray at a concentration of 100 p.p.m. With the exception of naphthoxyacetic acid, all these growth substances caused a decrease in the rate of apparent photosynthesis which continued throughout the duration of the experiments lasting from 2 to 4 days. Naphthoxyacetic acid resulted in an acceleration of photosynthesis

over a period of 3 days, after which the relative rates in treated and control plants became the same as before treatment. All the growth substances except indolebutyric acid caused a temporary increase in the rate of respiration at one period. It is concluded that the effects of the growth substances used upon the rate of apparent photosynthesis cannot be interpreted entirely on the basis of their effects upon respiration.—Northwestern University, Evanston, Illinois.

15. GALSTON, A. W.

Indoleacetic-nicotinic acid interactions in the etiolated pea plant.

Plant Physiol., 1949, **24**: 577-86, bibl. 18, illus.

Various physiological interactions between indoleacetic acid (IAA) and nicotinic acid (NA) have been demonstrated in the etiolated pea epicotyl. For example, NA enhances the root initiation activity of IAA (synergism), but IAA reverses the bud-growth stimulation produced by NA (antagonism). Evidence from bioassays indicates that tryptophan may be converted rapidly to IAA and slowly to NA, the latter conversion apparently occurring through kynurenine and 3-hydroxyanthranilic acid as intermediates. It is suggested that the various IAA-NA interactions may be explained on the basis of their origin from a common precursor tryptophan. [From author's summary.]—California Institute of Technology, Pasadena.

16. MACKOV, F. F., AND PODRAZANSKAJA, H. A.

Heteroauxin as a microfertilizer. [Russian.]

Doklady Akad. Nauk S.S.S.R., 1949, **66**: 973-5, bibl. 4.

The results tabulated for oats and sugar beet lead the authors to conclude that heteroauxin is a microfertilizer, a specific, organic plant micronutrient supplementing and increasing the effectiveness of, purely mineral fertilizers.

17. MOLOTKOVSKIA, G. H.

The significance of growth inactivators on plant dormancy. [Russian.]

Doklady Akad. Nauk S.S.S.R., 1949, **68**: 405-8, bibl. 12.

Dormancy in flowering plants is discussed in relation to inactivating substances. A substance having an inhibiting action on auxins was extracted from pumpkin fruits. The effects of the extract, together with various proportions of heteroauxin, on the germination of seeds of kok saghyz, pumpkin, pepper and cucumber are tabulated.

18. MOEWUS, F.

Gebundener und freier Wuchsstoff in fleischigen Früchten. (Free and fixed growth substance in fleshy fruits.)

Planta, 1949, **37**: 413-30, bibl. 23.

[For the application of the cress root test in the determination of growth substances used by the author, see *H.A.*, 19:1722.] Ripe fruits of black currant and cherry were found to contain only free growth substance, but unripe cherries harvested from the same tree at the same time contained 90% fixed and 10% free growth substance. In cherries and currants both the free and the fixed growth substance liberated by pancreatin was irreversibly destroyed by pea extract, which suggests that the growth substance present in

these fruits is identical with heteroauxin. Juices of unripe fruits were shown to be able to fix added heteroauxin, a faculty which juices of ripe fruits no longer possess. The hypothesis is put forward that growing organs have a high content of fixed, active growth substance, while resting organs contain heteroauxin only in the free, inactive state. The role of growth-inhibiting substances remains to be explained.—Kaiser Wilhelm Inst. f. Medizin, Heidelberg.

Propagation.

19. ROBERTS, R. H.

Theoretical aspects of graftage.

Bot. Rev., 1949, **15**: 423-63, bibl. 479.

A review of the work that has been done on various aspects of grafting, and a brief discussion of the problems that still remain unsolved. Note the bibliography, which occupies as much space as the article.

20. KIMBROUGH, E. F.

Making paper tubes for plant propagation.

For. Res. Notes Calif. For. Range Exp. Stat. No. **59**, 1949, pp. 5, from *For. Abstr.*, **10**: 2567.

Describes (with diagrams) a method of making tar-paper tubes for propagating cork oak seedlings. Its use in propagating horticultural trees and shrubs seems possible.

21. DUBROVICKAJA, N. I.

The influence of the growth conditions of leaves on their reproductive ability. [Russian.]

Doklady Akad. Nauk S.S.S.R., 1949, **66**: 961, bibl. 8.

Experiments with a number of horticultural plants for the rooting of leaf cuttings, success usually depending on the cuttings being taken at the period of most intense growth.

22. LAWRENCE, W. J. C.

The facts about soil block making.

Grower, 1949, **32**: 970-3.

A critical assessment of the value of soil blocks as compared with clay pots for plant raising, based on the results of experiments made at the John Innes Horticultural Institution during the last 2 years. The results show clearly that the standard size blocks produce better plants than 3-inch pots because of the greater amount of soil in the blocks. In the case of 3½-inch pots the difference up to planting out time is smaller and depends largely on management. The main disadvantages of soil blocks are the greater danger of drying out and the greater compression of the soil, which may initially retard growth. After planting out, however, block-raised plants grew more rapidly and were more forward than pot-raised plants.

23. PODOLSKAJA, O. I.

Increasing the germinating capacity of seeds sown in the field and hastening the growth of seedlings. [Russian.]

Doklady Akad. Nauk S.S.S.R., 1949, **67**: 573-5, bibl. 2.

In relation to raising trees for shelter belts, experiments

were carried out on the effect of certain chemicals on the germinating capacity of seeds of *Thuja orientalis*, *Juglans regia* and *Cercis canadensis*, and on the development of the resulting seedlings. Definite positive results were obtained with magnesium chloride, magnesium sulphate and potassium permanganate with thuja and walnut, but *Cercis* was less sensitive to chemical treatment.

Nutrition and nutrients.

24. CHU, T. S., AND TURK, L. M.

Growth and nutrition of plants as affected by degree of base saturation of different types of clay minerals.

Tech. Bull. Mich. agric. Exp. Stat. 214, 1949, pp. 47, bibl. 40.

The authors consider that the most outstanding finding of their investigation is the marked influence of the nature of the soil colloid upon crop response to increasing degrees of base saturation. Oats, rye and tomatoes were the plant material used in the pot trials described.—East Lansing.

25. VAN LIERE, W. J.

De invloed van het bodemprofiel op de ontwikkeling van enige tuinbouwgewassen. (Influence of the soil profile on the growth of some horticultural crops.) [English summary $\frac{1}{2}$ p.]

Meded. Dir. Tuinb., 1949, 12: 677-83.

Crops on different holdings on equivalent types of soils, but scattered over large areas, give better results than on holdings in the established large horticultural districts; this is considered due to the decreased risk of infestation by diseases and pests. Steam sterilization of soil gives varying results according to soil conditions. On peat soils near Amsterdam, fusarium in cucumbers is being controlled by grafting. Lettuce being very sensitive to soil texture shows great variation in yield. Soils are classified according to their suitability for horticulture, the classification being founded on a soil survey map.

26. MACINTIRE, W. H., AND OTHERS.

Effects of fluorine in Tennessee soils and crops.

Industr. Engng Chem., 1949, 41: 2466-75, bibl. 78.

The findings are from 20-year laboratory, lysimeter, and pot-culture experiments on the chemical and biochemical behaviour and the fate of fluorine after it reaches soils through insecticides, fertilizers, cryolite, etc., and in particular the migration of the element from soil into vegetation. Soils were found to possess remarkable retention of the fluorine carried by insecticides, fertilizers, and various fluorine compounds but, regardless of the nature and quantity of the fluorides, virtually no uptake of fluorine by the vegetation took place from soils with an adequate content of calcium. Comparative analyses of crops grown on soils, in place and after transportation to unaffected points, served to support the conclusion that abnormal incidence of fluorine in field vegetation is attributable to atmospheric contaminants. [From authors' summary.]—Univ. of Tennessee Agric. Exp. Stat.

27. POLI, G., AND OTHERS.

Recherches effectuées en 1948 par les stations agronomiques. (Fertilizer studies by French research stations in 1948.)

Ann. agron. Paris, 1949, 19: 657-745, bibl. 51.

Including the following articles: J. Liwerant, Toulouse, pp. 679-80: Analysis of peach leaves: The chemical composition of the leaf is determined not only by its age, but also by its position on the branch.—A. Hamy, Chateauroux, pp. 684-5: A study of the ripening of fruits: Data are presented on the phosphoric acid content of green and ripe apples. An increase in the concentration of phosphoric esters in ripening tomatoes is also noted.—G. Drouineau and G. Lefèvre, Antibes, pp. 702-3: An analysis of the compost made from grape residue.—G. Barbier, S. Trocmé and J. Chabannes, Versailles, pp. 708-9: Manganese deficiency induced by irrigation with sewage water: Analytical data for leeks and spinach are tabulated.—P. Boisshot, Mlle Duroux, Versailles, p. 718: The effect of fertilizer placement on potato yields: Bands placed at the level of the tubers gave the best results.—J. Garola, Chartres, pp. 722-3: The effect of repeated nitrogen applications on potato yields: A single N application of 80 kg./hectare produced the highest yields; and pp. 727-8: Potato manuring at Beauce: 30,000 kg./hectare of stable manure did not supply all the nitrogen needed.—G. Drouineau and P. Gouny, Antibes, pp. 734-6: The role of organic manure in flower culture: Arrested growth of carnations in the neighbourhood of Nice was diagnosed as being due to phosphate deficiency. Supplies of this nutrient, however, did not remedy the situation until stable manure was added, the soil having a very high content of soluble lime. In the same way a trouble of carnations caused by potassium deficiency in calcareous clay soils could not be remedied merely by applying potassium.

28. GROOTENHUIS, J. A.

De betekenis van compostmeststoffen voor de tuinbouw. (The significance of compost for horticulture.) [English summary $\frac{1}{2}$ p.]

Meded. Dir. Tuinb., 1949, 12: 698-708.

A review of the subject with a table showing the composition of certain kinds of compost and refuse.

29. NICHOLAS, D. J. D.

The manganese and iron contents of crop plants as determined by chemical methods.

J. hort. Sci., 1949, 25: 60-77, bibl. 31.

Rapid chemical tissue tests for manganese are described which can be used for the determination of the element at deficiency and toxicity levels in plant tissues. The method has been used for the study of the manganese status of a wide range of crop plants growing at centres differing markedly in soil characters. It is shown that the manganese contents of plants vary considerably with the soil pH, whereas the iron levels in the tissues are relatively constant irrespective of soil acidity or alkalinity. The ratio of "total" iron to manganese in plant tissues does not appear to be of importance in the diagnosis of a deficiency or toxicity of manganese in the crops studied. The availability of manganese to the various crops in the three types of soil was reflected by the manganese levels found in the plants. [Author's synopsis.]—Long Ashton Research Station, Bristol.

30. MULDER, D.

Sporen-elementen in de tuinbouw. (**Trace elements in horticulture.**)

Tuinbouw, 1949, 4: 62-5, 99-101, illus.

The role played by trace elements in horticulture is discussed with reference to: what are trace elements?; how do they act?; deficiency symptoms; the relation between types of soil and deficiency symptoms; control of deficiency diseases. The author says that there is a great shortage of trace elements in horticultural crops, but there are also methods known by which the shortages can be overcome. When these methods are fully exploited, lack, at least of trace elements, will no longer check the increase in quantity and quality of horticultural crops.

31. MACKOV, F. F.

Applying fertilizers to plants otherwise than through the roots. [Russian.]

Doklady Akad. Nauk S.S.S.R., 1949, 66: 733-6, bibl. 16.

Records positive results from applying fertilizers and micro-elements by spraying the above-ground organs of a number of agricultural and horticultural plants. Results are tabulated for sugar beet, potato, and sainfoin.

32. TSUI, C.

Zinc and plant respiration.

Nature, 1949, 164: 970, bibl. 4.

From experiments with tomatoes it is concluded that "zinc plays no direct part in the respiratory system of the higher plants".—University of Wisconsin.

33. ŠKOLJNIK, M. JA., AND MAKAROV, N. A.

One of the causes of variation in boron and zinc requirements in different media. [Russian.]

Doklady Akad. Nauk S.S.S.R., 1949, 68: 409-12, bibl. 10.

The antitoxic action of boron and zinc with regard to copper is shown in cultures (with Knop's solution as base).

34. McAULIFFE, C.

Determination of radiophosphorus in plant material by solution counting.

Anal. Chem., 1949, 21: 1059-61, bibl. 14.

A rapid method for the determination of P^{32} in solution is described, accurate to a standard deviation of a single measure of less than 1%.

Practical technique.

35. SCHWANITZ, F.

Eine neue wirkungsvolle und sparsame Methode der Colchicinbehandlung (Colchicin-Traganth-Schleim). (A new effective and economical method of treating plants with colchicine [colchicine-tragacanth gum].)

Züchter, 1949, 19: 301-2.

Colchicine-tragacanth gum was found to be much more effective than an aqueous colchicine solution.

36. SEPTROUX, J.

Les explosifs en agriculture et en horticulture. (Explosives in agriculture and horticulture.)

Rev. Agric., 1949, 2: 19-28, abstr. in *Ann. Gembl.*, 1949, 55: 164.

The application of explosives in the cultivation of the soil, the different types of explosives and methods of using them are described.

37. C., V.

L'explosif agricole et les cultures en terrasse.

(The use of explosives in terrace culture.)

Progr. agric. vitic., 1949, 132: 19-20, illus.

Explosives may be used in terrace cultures to prevent erosion and increase fertility. At the edge of each terrace, which is given a slight slope upward, a mound of earth or a low wall is built. In the hollow thus made cartridges are inserted every 5 to 10 metres apart and 0.8 to 1.0 m. deep, and exploded, the holes being then filled with stones. Water rushing down the hillside is checked by the walls and flows between the stones into the soil. Plants and trees on the terraces and on the slopes are resistant to drought and grow vigorously, the winter rains and the dews maintaining soil moisture. In this way fruit trees can be grown on rocky slopes as in the Eyrieux valley (Ardèche) where peach trees have been planted on such slopes.

38. EVERSDIJK, M. S.

"Soilless Culture."

Tuinbouw, 1949, 4: 146-7, illus.

A review of the history, methods, and possibilities of soilless culture based on observations at Curaçao and at various research stations in the United States.

39. WASSCHER, J.

Kan de grindcultuur betekenis krijgen voor de tuinbouw in ons land? (Can gravel culture become of importance to horticulture in Holland?) [English summary 12 ll.]

Meded. Dir. Tuinb., 1949, 12: 684-97, bibl. 25, illus.

The advantages claimed for gravel culture are: 1. higher yield of better quality, since conditions of growth can be easily adjusted, 2. independence of soil types, 3, labour saving, 4. avoidance of disease. The disadvantages are a difficult technique and a high cost of installation. It can be recommended only for very intensive cultivation (e.g. flowers), particularly for crops liable to diseases arising from soil conditions.

40. GREENHAM, C. G., AND COLE, D. J.

Diagnosis of death in roots.

Nature, 1949, 164: 669, bibl. 2.

A simple electrical device is described by two Australian workers. Further details are promised elsewhere.

41. KULP, D. A.

Treating fence posts with pentachlorophenol-fuel oil solutions using the cold-soaking method.

Circ. Miss. agric. Exp. Stat. 141, 1948, pp. 11, illus.

A full description of the cold-soaking method of applying pentachlorophenol solution to pine posts. Though this method is not so effective as the pressure method, it is much simpler and will ensure a very much longer life for the posts than no treatment.

42. PILLS, F. W. G.

Drainage in de tuinbouw. (Drainage in horticulture.)

Meded. Dir. Tuinb., 1949, 12: 709-16.

Discussed with reference to the air-water ratio of horticultural soils.

43. VAN DEN MUIJZENBERG, E. W. B.
De trekker in de tuinbouw. (The tractor in horticulture.) [English summary $\frac{1}{2}$ p.]
Meded. Dir. Tuinb., 1949, 12: 744-60, bibl. 35.

A survey of the historical development and the present use that is being made of tractors on the farm. Tables show: 1. the number of tractors recently in use in agriculture and horticulture in Holland, Belgium, England and America, and 2. some 250 possibilities of using tractors in horticulture, including several recent developments.

44. VAN GEEL, J. D. W.
Sproei-installaties. (Irrigation plant.)
[English summary 10 ll.]
Meded. Dir. Tuinb., 1949, 12: 771-8, bibl. 4, illus.

In some seasons irrigation of horticultural crops in Holland results in considerable increase in yields. Types of pump and motor are discussed. The "artificial rain" system (rotary sprinklers, pipes, oscillating sprinklers with fine nozzles) to be applied depends on the water supply available. The salt content, hardness and temperature of the water must be considered.

Glasshouses.

(See also 6-10, 48i, 107, 275, 362, 467.)

45. SPOELSTRA, P. A.
Nieuwe gezichtspunten bij kasverwarming door middel van warm water. (New views on heating glasshouses with hot water.)
Meded. Dir. Tuinb., 1949, 12: 794-800, bibl. 6, illus.

The application of circulation accelerating pumps, the use of narrow pipes, and boilers with a large water content and a mixing gear are advocated.

46. WIT, J.
De toepassing van bestrijdingsmiddelen in kassen. (The application of insecticides and fungicides in glasshouses.) [English summary $\frac{1}{2}$ p.]
Meded. Dir. Tuinb., 1949, 12: 541-52, illus.

Besides direct spraying and dusting, use can be made in the greenhouse of "space treatment", the preparations being directed not on the plants but in the free space of the house and carried to all parts by air currents and diffusion. Such treatment includes gassing, evaporation, fumigation, and the application of fine mist-like sprays. The chief advantage of such methods is labour saving. The number of products suitable for this purpose has recently increased owing to modern methods of producing fine sprays (aerosol bomb, aerocide and atomizer).—Naaldwijk.

47. WALKER, T. W., AND THOMPSON, R.
Some observations on the chemical changes effected by the steam sterilization of glasshouse soils.

J. hort. Sci., 1949, 25: 19-35, bibl. 6.

Some of the chemical changes following steam sterilization have been examined both in commercial glasshouses and in laboratory experiments [in N.W. England]. Changes in the ammonia concentration, water-soluble organic matter, water-soluble manganese and pH have been followed. The production of ammonia in steamed soils of varying moisture contents

and of varying pH as well as in soils steamed for various times, has been estimated over a period of some weeks. Steaming soils of high moisture content and high pH leads to the production of larger amounts of ammonia than does steaming under drier and more acid conditions. The length of time of steaming has little effect on the production of ammonia. Steaming leads to an increase in water-soluble and exchangeable manganese, especially in acid soils. Liming a soil before steaming has a very marked effect on the production of ammonia and water-soluble organic matter. The possible toxic effects of ammonia, water-soluble organic matter and manganese on plants are discussed. The conditions of steaming, likely to reduce these possible effects to a minimum, are defined. [Authors' summary.]

Noted.

48.
a BARSHAD, I.
Molybdenum determination in plant material. Modification of thiocyanate stannous chloride method.
Anal. Chem., 1949, 21: 1148-50, bibl. 11.
b BONNER, J., AND THURLOW, J.
Inhibition of photoperiodic induction in *Xanthium* by applied auxin.
Bot. Gaz., 1949, 110: 613-24, bibl. 11, illus.
c BONNER, J.
Further experiments on flowering in *Xanthium*.
Bot. Gaz., 1949, 110: 625-7, bibl. 4.
d FLÜGEL, A.
Die Gesetzmässigkeiten der endogenen Tagesrhythmik. (The laws underlying the diurnal endogenous rhythm of the leaf movements of *Phaseolus multiflorus*.)
Planta, 1949, 37: 337-75, bibl. 13.
e JONES, R. L., METCALFE, T. P., AND SEXTON, W. A.
The relationship between the constitution and the effect of chemical compounds on plant growth. 1. 2-phenoxyethylamine derivatives.
Biochem. J., 1949, 45: 143-9, bibl. 18.
f KENTEN, R. H., AND MANN, P. J. G.
The oxidation of manganese by plant extracts in the presence of hydrogen peroxide.
Biochem. J., 1949, 45: 255-63, bibl. 21.
Extract prepared from horse-radish roots.—Rothamsted.
g KOVERGA, E. L., AND KOVERGA, A. S.
A micromethod for determining the total alkaloids of belladonna and thornapple in ultraviolet light. [Russian.]
Biohimia (Biochemistry), 1949, 14: 436-40.
h MAPSON, L. W., CRUICKSHANK, E. M., AND CHEN, Y.-T.
Factors affecting synthesis of ascorbic acid in cress seedlings. 2. Ascorbic acid synthesis in relation to sugar formation.
Biochem. J., 1949, 45: 171-9, bibl. 10.
i MINISTRY OF AGRICULTURE.
Red spider mite [*Tetranychus telarius*] on glasshouse crops.
Adv. Leaflet. Minist. Agric. Lond. 224, 1949, pp. 4, 1d.

- j PUCHER, G. W., AND OTHERS.
Studies in the metabolism of crassulacean plants: diurnal variation of organic acids and starch in excised leaves of *Bryophyllum calycinum*.
Plant Physiol., 1949, 24: 610-20, bibl. 13.

- k STRUCKMEYER, B. E., HILDEBRANDT, A. C., AND RIKER, A. J.
Histological effects of growth regulating substances on sunflower tissue of crown-gall origin grown *in vitro*.
Amer. J. Bot., 1949, 36: 491-5, bibl. 15, illus.

TREE FRUITS, DECIDUOUS.

General.

(See also 463-466, 469, 473, 476, 477, 479, 483-486.)

49. KINMAN, C. F., AND MAGNESS, J. R.
Pear growing in the Pacific Coast states.
Fmrs' Bull. U.S. Dep. Agric. 1739, revised 1949, pp. 38, bibl. in text, illus.

Pears are an important commercial crop in the three Pacific Coast States, California, Oregon and Washington. The typically dry summers with abundant sunshine and sufficient winter cold to allow the trees a long rest period are particularly favourable to this crop, and fruit quality is high and production heavy. As irrigation is widely used in this area, rainfall is not an important factor, and winter temperature determines the limits of commercial production. The bacterial disease known as pear blight (*Erwinia amylovora*), which makes it necessary to grow partly resistant varieties in most parts of the United States, can be controlled sufficiently well on the Pacific Coast to permit the growing of choice varieties even though they are susceptible. Commercial production, however, is restricted to a few specially favourable areas, and the factors affecting production in these areas are here discussed in detail. The most widely used stock is the French pear (*Pyrus communis* L.) which would be considered ideal, were it not for its susceptibility to pear blight. Japanese stock (*P. pyrifolia*) planted extensively for some years because of its resistance to blight and woolly aphis, is decreasing in popularity as it produces an unsatisfactory tree on heavy, wet or shallow soils and induces black end disease of the fruit. Quince stock is only used where the soil is shallow, or where close planting or early fruiting is desired. In the northern sections where an abundance of water is available for irrigation, pear orchards are usually maintained in a permanent cover crop of alfalfa or sweet clover. In other regions clean cultivation is practised throughout the summer months, and annual cover crops or weeds grown in winter. Other subjects dealt with in this bulletin are pollination practices, pruning, thinning and control of insect pests and diseases. Notes are given on the chief pear varieties grown; of these, mostly imported from Europe, Anjou, Bartlett, Bosc and Winter Nelis are the most important.

50. RENOUF, L. R.
Quince culture.

N.Z. J. Agric., 1949, 79: 65-8.

Quinces have been grown in New Zealand for many years. More recently they have been planted in commercial orchards there, and now there are about 167 acres of quinces, mostly in the Auckland, Hawke's Bay and Nelson districts. Notes are given on soil and situation, propagation (mostly on own rootstocks budded to the varieties required), cultivation and

manuring, varieties (six that have proved successful in New Zealand are briefly described), pruning, control of pests and diseases (codling moth, fabraea scald and fireblight).

51. MARSOLAT, R.
Une vieille richesse qui se meurt: l'olivier. Comment relever notre oléiculture. (Olive growing in France, its decline and possible resuscitation.)
Progr. agric. vitic., 1949, 131: 328-36; 132: 10-16, 67-72, 189-94, 215-23, 237-47.

The author deplores the decline of olive-growing in France and suggests means of improving it. His points are discussed under: I. The most ancient of cultures, A. the olive in France (fluctuations in its culture throughout the ages), B. the olive throughout the world (yields of oil in olive-growing countries). II. The causes of the crisis in French olive growing. III. A remunerative culture. IV. The future of olive growing in France, including notes on pruning, manuring, choice of varieties, grafting and varieties suitable as scions for top-grafting, the use of olives in confectionery.

52. HÉLAUT, M.
Situation de l'oléiculture et de la production de l'huile d'olive au Maroc. (Olive culture and the production of olive oil in Morocco.)*
Oléiculture et Oléotechnie. Rapports et travaux du 12^e Congrès Internat. d'Oléiculture, 1949, pp. 77-89, from abstr. in *Oléagineux*, 1949, 4: 775.

The number of olive trees in Morocco is 9,700,000. Production does not meet demand, and means of increasing production, by cultural practices and extension of the plantations, are discussed.

53. FANELLI, L.
L'olivicultura e le varietà di olive della provincia di Potenza. (Olive growing and olive varieties in the province of Potenza.) [English summary 13 ll.]
Ann. Sper. agrar., 1949, Vol. 3, Fasc. straord., pp. 357-408.

This province of southern Italy is mainly mountainous and about a million and a half olives grow in its mountains. The most important and numerous are those grown for oil, and 5 of the chief oil-producing varieties, Ogliarola, Rotondella, Rossolella, Cannellina and Ogliastro, are here described. Five dessert varieties are similarly described. Shorter descriptions are given of numerous other, some of them local, varieties, and the value of particular varieties is discussed. Less attention is paid to cultivation practice than in Apulia.

* See also 466.

54. PUFFELES, M.

Some data on Palestine olives and olive oil.
J. Soc. chem. Ind. Lond., 1949, 68: 219-20,
bibl. 2.

Earlier work had shown that the oil and protein content of Palestinian olives is markedly inferior to that of olives grown in other Mediterranean countries. Tabulated data obtained in 6 years' experiments of the Department of Agriculture indicate that neither various manurial treatments nor irrigation are capable of improving the composition of the flesh. Careful handling of the crop, however, reduced acidity (expressed as oleic acid) from 3.5-10.0% to 0.3-0.4%. Methods of pressing and storage were worked out to prevent the oil from turning dark and rancid.

55. MÁRSICO, D. F.

La olivicultura en los países del Mar Mediterráneo y en la República Argentina. (Olive culture in the Mediterranean countries and in Argentina.) [English summary 8 ll.]
Bol. Fac. Agron. Vet., Univ. Buenos Aires 29, 1949, pp. 36, bibl. 14, illus.

A survey is made of the status of the olive industry in the Mediterranean countries, with a brief analysis of the factors affecting olive culture and trade in these countries, and tables of production, export and import figures for the last 20 years. The second part of the paper deals with the development of the olive-growing industry in Argentina. Production has steadily increased from 20,000 tons in 1929 to 220,000 tons in 1946, but it is considered that plantations might still be profitably extended in certain favourable districts.

56. RADŽABLI, A. D., AND BELIKOV, S. A.
Promising varieties of olive for Azerbaidžan.
[Russian.]

Sad i Ogorod (Orchard and garden), 1949,
No. 9, pp. 30-3, illus.

The conditions in the south of Russia between the Black Sea and Caspian are considered suitable for olive growing, particularly in the Apšeron (Apsheron) Peninsula of the Azerbaidžan Republic. For Azerbaidžan, varieties needed are such as are frost-resistant, early ripening, and fruit with a high percentage of oil and pulp. Twelve varieties raised from the seed of open pollinated local varieties are briefly described with particular reference to their frost resistance and the suitability of the fruit for the preparation of salad oil or for pickling.

57. SERGEEVA, K. A.

The critical period in the yearly cycle of the development of the olive tree. [Russian.]
Doklady vsesojuz. Akad. sel'sk. Nauk
S.S.S.R., 1949, No. 11, pp. 31-3, bibl. 9.

The author discusses the "critical period" in plants, i.e. the period when a plant requires most water, and then describes experiments carried out on olive trees in southern Crimea, determining the loss of water and respiration intensity of 1-year-old leaves and the growth increase of the crown shoots throughout the year, in relation to the weather. The critical period for olives in that region—when respiration was most intense and shoot growth most vigorous—was during May and June, and cultural operations should be such that there is an adequate supply of water during that period.

58. BUZI, C. C.

Gli olii di oliva dell'alta Italia e della Sardegna. (The olive oils of northern Italy and Sardinia.) [English summary 12 ll.]
Ann. Sper. agrar., 1949, Vol. 3, Fasc. straad., pp. 409-50.

The organoleptic and chemical characters of the oils from the chief olive varieties of northern Italy and Sardinia are set out in detail. It would not appear possible to identify an olive variety from its oil, except, under special conditions, the Colombian variety. The Province of Imperia produces particularly good oils.

59. FEDOROV, M. A.

The commercial culture of figs. [Russian.]
Sad i Ogorod (Orchard and garden), 1949,
No. 8, pp. 45-50.

Wild figs are widely distributed in the subtropical and southern provinces of U.S.S.R. and the fig can be grown with success in those regions. The climatic conditions of the chief fig-growing provinces, in relation to the sugar content of the fruit are tabulated, the accumulation of sugar in the fruit being in direct proportion to the rainfall during the ripening period, though very moist air may cause the fruit to crack and turn sour. The best figs are sun-dried, but this is impossible when the air is very moist. Irrigation is necessary where rainfall is low. The trees can be grown as bushes or standards, the latter being preferable if the fruit is to be dried. The qualities required for figs to be sun-dried are set out. Advice on pruning is given.

60. OFFNER, J.

Sur un arbre fruitier exotique en Dauphiné: *L'Hovenia dulcis*. (An exotic fruit tree introduced into Dauphiné: *Hovenia dulcis*.)
Pomol. franç., 1949, 76: 45-6.

An account of trees of *Hovenia dulcis*, the Japanese Raisin tree, now growing in the south-east of France. The properties of the tree and its fruit are described. It can withstand a temperature of -18°C . but is very sensitive to drought. Calcareous soil is unfavourable for it.

Breeding.

(See also 3-5, 35, 100c.)

61. WELLENISIEK, S. J.

Een systematisch veredelingsplan voor dé appel volgens moderne methoden. (A systematic apple breeding project on modern lines.) [English summary 12 ll.]
Meded. Dir. Tuinb., 1949, 12: 462-9, bibl. 9.

Modern breeding methods in horticulture suggest, for example, the possibility of breeding an apple variety of good quality which by flowering late escapes frost damage. The method of back-crossings is advocated. The application of the method is discussed under: (1) the effect of removing the corolla on insect pollination, (2) pollen storage, (3) promoting self-fertilization by bud pollination or by growth hormones. The time taken to complete one generation is decreased by embryo culture, by artificial illumination during winter, and by grafting the seedling as early as possible on weak rootstocks such as M. IX.

Root growth.

(See also 40.)

62. YANKOVITCH, L., AND BERTHELOT, P.
Rapport sur l'enracinement de l'olivier et des autres arbres fruitiers en Tunisie.* (An account of the root systems of the olive and other fruit trees in Tunisia.)

Ann. Serv. bot. agron. Tunis., 1947, 20: 111-76, bibl. 22, illus. [received 1949].

Most of this paper is devoted to a study of the root systems of mature olive trees that have made good, bad or indifferent growth on various soils under the dry conditions of southern Tunisia. The technique used was a modification of that developed by Oskamp in the U.S.A.; trenches were cut 1 metre from the trunks, 1 metre wide and 3 metres long, with depths up to 4 metres and occasionally more. Soil samples were taken for the different horizons and subjected to physical analysis and analysis for CaCO_3 , NaCl and in some cases for other elements. The tree roots were exposed by jets of water, and all those over 0.5 mm. recorded, layer by layer, throughout a representative profile with a surface area of 80 sq. cm. The profiles with the roots plotted in position are shown on a 1:25 scale. The examination of the root systems always showed a high concentration of feeding roots in the surface soil, but in the subsoil root density varied greatly between the different horizons, and this degree of exploitation was found to be directly related to the physical nature of the horizon. [In considering water-holding capacity, the authors found that clay content alone was an insufficient guide, in view of the part played by other fine fractions, notably fine calcareous sand, and they compromised by adopting the formula "clay + $\frac{1}{2}$ total CaCO_3 ".] The area occupied by the root system was found to be considerable; in trees 30-40 years old one covered 260 sq. metres and another 530 sq. metres, the areas in both cases being that allowed by the spacing between trees. Examination of soil profiles showed roots penetrating to a depth of over 6 metres under favourable conditions. It is concluded that under the low rainfall conditions of southern Tunisia the ideal soil for olives has a sandy surface with a clay content below 10%, while in the subsoil the clay content increases gradually with depth up to a maximum of 35%, this arrangement permitting both maximum penetration and retention of water. Given moister conditions, medium to light top soils over heavier subsoils are suitable. The presence in some areas of a calcareous pan just below the top soil has always been found detrimental, even though the roots can penetrate it. The adverse effects of excessive NaCl in the subsoil have also been noted, but the information is as yet inconclusive. Among other fruit trees the root systems of 5 almond trees were examined. Apart from the presence or absence of a tap root, depending on whether the trees had been grafted *in situ* or transplanted from a nursery [also noted in apricots], the trees resembled the olive in the concentration of feeding roots in the top soil and in certain horizons of subsoil. Differences in the soils examined, however, made direct comparisons impossible, but it would appear that the almond is better

adapted than the olive to light soils and subsoils and less able to utilize clay layers in the subsoil. The root systems of one tree each of apricot, fig, and pear and of two pomegranates are also described. G.K.A.

Rootstocks and propagation.

(See also 1, 19-23, 49, 50.)

63. HÜLSMANN, B.
Beobachtungen über das Anwachsen von Obstunterlagen vor der Veredlung. (Observations on the rooting of fruit tree rootstocks before they are worked.)
Züchter, 1949, 19: 315-18, bibl. 5.

The paper is one of a series of publications by the author dealing with his work on rootstocks at Berlin-Dahlem up to 1949 [see H.A., 19: 1791, 1795, 1976]. Data from 4-5 years' observations are presented on the survival percentage of rooted shoots from stool beds of selected apple, quince and plum rootstocks planted out in the nursery. Plum seedlings were also considered. Losses seem to be determined by the root development of the shoots and seedlings at the time of planting out, the greater the development the better the subsequent results.

64. KÜPPERS, H.
Zur Frage der Verwendung von Apfelunterlagen verschiedener Wildarten. (The utilization of certain wild species as apple rootstocks.)
Dtsch. Baumsch., 1949, 1: 133, 166.

In contrast to all other wild species tested, *Malus baccata*, *M. toringo* and *M. sikkimensis* were surprisingly uniform as 1-year-old seedlings, but the first-named proved highly incompatible. Surviving combinations were found to be vigorous and to yield well. From these the author is attempting to develop clones. The most promising method of obtaining new rootstocks is the hybridization of varieties and wild species with subsequent clonal propagation. O.J.

65. ŠPONJKO, G. A.
Rootstocks from seedlings of cultivated varieties of apples. [Russian.]
Sad i Ogorod (Orchard and garden), 1949, No. 8, pp. 18-23, illus.

Seedling rootstocks raised from seed of cultivated varieties of apple are compared in the performance of varieties on them, with that of the same varieties on wild crab stocks. The tabulated results of the "take", and vigour of the resulting trees, show that such seedlings make suitable rootstocks.

66. ŽUČKOV, N. G.
Making use of overgrown wilding apple seedling plants. [Russian.]
Sad i Ogorod (Orchard and garden), 1949, No. 9, pp. 10-13.

Since there is a scarcity of nursery fruit trees in Russia it is advised that use be made of overgrown wilding apple seedling trees which would otherwise be destroyed. Pruning, shaping, and grafting such trees are described. As they are often more resistant to frost than commercial varieties, their value as rootstocks in this connexion is enhanced.

* For short account of this work see C.R. Acad. Agric. Fr., 1948, 34: 774-6; H.A., 19: 124.

67. PFANNENSTIEL, A., AND PFANNENSTIEL, D.
Neue Unterlagen für Apfel- und Birnbaum.
(New rootstocks for apple and pear trees.)
Züchter, 1949, 19: 314, bibl. 5.

The usual high percentage of success was achieved when apple and pear varieties were root-grafted on pear and apple seedlings respectively. During 3 years of observation there was no indication of incompatibility between the two species. It is important that the union should be below the surface of the soil and that the tying material should rot before secondary growth sets in, to avoid the disturbance associated with its removal. The scion may have a length of 2-3 buds, of which the top one should just emerge from the soil. In the poor soil at the authors' disposal 2-year-old rootstocks, of pencil thickness, gave better results than 1-year-old. No figures are published in view of the preliminary nature of the experiments.

68. RANDHAWA, G. S., UPSHALL, W. H., AND TUKEY, H. B.
The problem of undersize fruit in Kieffer pear orchards.
Sci. Agric., 1949, 29: 482-9, bibl. 12, illus.

In most orchards of Kieffer pears (*Pyrus pyrifolia* × *P. communis*) a proportion of the trees show premature autumn leaf coloration and bear undersized fruits of poor quality. Such trees occur at random throughout an orchard; they are generally dwarfed and show an abnormally high mortality rate. Observations in Ontario nurseries show that from 3 to 10% of the Kieffer nursery trees exhibit a similar premature leaf coloration. A study of the problem made at Michigan State College indicates that this condition is due to nutritional difficulties brought about by a poor graft union. The graft unions of red-leaved Kieffer trees show a partial check to the passage of water and elaborated foods, which adversely affects the growth, cropping and life of the trees. In contrast to the graft unions of green-leaved trees, they are weaker and show greater swelling. Analyses indicate that a low level of nitrogen and calcium encouraged anthocyanin formation in the leaves. The authors suggest that as Kieffer pear is not always congenial on French pear (*P. communis*) seedling stock, or on its own seedlings, a better rootstock is desirable; unless such a rootstock becomes available, it might be wise to grow Kieffer on its own roots. In nurseries and established orchards the elimination of small, red-leaved Kieffer trees is advised.

69. RANDHAWA, G. S., AND UPSHALL, W. H.
Congeniality of some pear varieties on quince A.
Sci. Agric., 1949, 29: 490-3, bibl. 3.

One- and two-year-old nursery trees were used in these compatibility studies at Vineland and other places in Ontario. Laboratory tests showed that Bartlett, Clapp's Favourite and Kieffer are not congenial with Quince A rootstocks, their uncongeniality being shown by abnormal swelling at the union, resistance to flow of water through the union, starch accumulation above the union, discontinuity of bark and wood tissues at the point of union, and ease of breakage at the union. Old Home, Hardy and Anjou seemed to be reasonably congenial with Quince A.

70. UPSHALL, W. H., AND DICKSON, G. H.
Seedling and clonal rootstocks for pears.
Sci. Agric., 1949, 29: 494-6, bibl. 3.

Observations and experiments made at the Horticultural Experiment Station, Vineland, Ontario, suggest that the premature coloration of pear leaves on individual trees in the nursery is an indication of uncongeniality between rootstock and scion. Trees on seedling stock gave a very variable performance in the orchard. A study was also made of the performance of Kieffer pear (*Pyrus pyrifolia* × *P. communis*) on 6 Malling clones of seedling pear over a period of 9 years. Two clones, C3 and D3, had a very dwarfing effect and reduced yields considerably. At the end of 9 years B1 stock showed the highest yield, but C8 had the best annual record of leaf colour and fruit size. Differences between performance observed in these tests and in tests made at East Malling with the scion variety Dr. Jules Guyot indicate the importance of testing new rootstocks with many varieties and under various climatic and soil conditions.

71. DRAGOŽANSKAJA, V. M.
New varieties of rootstocks for pears. [Russian.]
Sad i Ogorod (Orchard and garden), 1949, No. 8, pp. 23-5.

Chinese species of pear were found to provide good rootstocks for cultivated varieties of pear. They easily become acclimatized to new conditions of climate and soil, and they are more vigorous and resistant to drought than the wildings generally used as pear rootstocks in North Caucasian regions. Data are tabulated to show the vigour of the 1-year-old seedlings of the Chinese pears, and of young trees grafted on them and on wilding pear seedling.

72. SOUČEK, J.
Slivoňové podnože. (Plum rootstocks.)
Rádce Zemědělské 85, 1948, pp. 62+tables, bibl. 5, illus., Kčs. 27.

In this bulletin issued at Prague the author discusses the confusion that previously reigned with regard to plum rootstocks, the work in England and elsewhere and the decision to establish trials at Pruhonice. He gives 3 lists of plum rootstocks, namely those tried at East Malling, those commonly used in Germany and those used in Czechoslovakia. The rootstocks tested at Pruhonice and later at Jičíně were: (1) Vegetatively raised stocks, Common Mussel, East Malling St. Julien, E.M. Myrobalan B, and E.M. Damas C, a local variety Švestkový Odkopek and the German Marunke. (2) Stocks raised from seed included Švestkový Semeňáč, St. Julien, Myrobalan and *Prunus catalonica*. Each rootstock was budded close to ground level with 20 specimens of each scion. The trees were transplanted to their permanent quarters when 5 years old. In the nursery, frost resistance was found to be greatest in seedling St. Julien, followed by Švestkový seedling and Švestkový Odkopek vegetatively raised, Myrobalan seedling, Spendlik Golden seedling, Common Mussel, E.M. Damas C, Marunke, E.M. St. Julien A, E.M. Myrobalan B. Frost resistance varied greatly with the scion varieties, which are also noted in order of resistance. The largest growth was made on half-standard trees on *Prunus myrobalana* [seedling] and the smallest on Švestkový seedlings. Crops varied very greatly,

especially from trees on seedlings. From the experimental data, which are tabulated, the author makes recommendations of stock/scion combinations suitable for Czechoslovakia.

73. VAN SOEST, W.
Pruimeonderstammen. (Plum rootstocks.)
[English summary $\frac{1}{2}$ p.]
Meded. Dir. Tuinb., 1949, 12: 470-81.
- The history and classification of plum rootstocks are outlined, the characters required of an ideal rootstock are enumerated, and methods of propagation described. The influence of the rootstock on the scion is shown in tabular form with reference to vigour, fruitfulness, size of fruit, and susceptibility to silver leaf. The various plum rootstocks in use are briefly described.

74. SANNIKOV, V. C.
The effect of rootstocks on plum yield.
[Russian.]
Sad i Ogorod (Orchard and garden), 1949, No. 8, pp. 26, 27.
- Data presented show the differences in yield of three varieties of plum when worked on three different rootstocks. Markedly low yields were obtained with the American Sand Cherry as rootstock.

75. JACOBONI, N.
Affinità e intensità metabolica nell'olivo innestato. (Compatibility and rate of metabolism in the grafted olive.)
Olivicoltura, 1948, 11: 3-7, and *Olearia*, 1949, 3: 48, from abstr. in *Oléagineux*, 1949, 4: 775.
- An investigation to determine which of the species of olive used as rootstocks are sufficiently compatible with the variety Moraiolo to be used as a basis for ensuring a long life for that variety.

76. ANON.
Groeistoffen bij het stekken van onderstammen. (Growth substances for rootstock cuttings.)
Fruiteelt, 1949, 39: 781, illus.
- Experiments at Boskoop with cuttings of E.M. type VII apple and St. Julien A plum show increased rooting following treatment with β -indoleacetic acid at 100 mg./l. for the apple and 50 mg./l. for the plum.

77. BOULAY, H.
Une greffe trop méconnue en pépinière: la greffe anglaise compliquée. (A method of grafting neglected in nurseries: the tongue graft.)
Pomol. franç., 1949, 76: 107-10.
- A plea for a more extended use of the tongue graft in nurseries. The author has obtained excellent results on cherries grafted in spring or autumn (he prefers autumn) and good results on pears and apples.

Pollination and bees.

(See also 195, 196.)

78. VANSELL, G. H.
Pollen and nectar plants of Utah.
Circ. Utah agric. Exp. Stat. 124, 1949, pp. 28, illus.
- Written to encourage the keeping of more bees for the greater production of honey and the considerable benefit of agriculture.

79. KATZNELSON, H., AND GOODERHAM, C. B.
Sulfathiazole in relation to American foulbrood.

Sci. Agric., 1949, 29: 340-44, bibl. 14.

From a brief review of the literature and from results of several experiments on the effect of sodium sulfathiazole on American foulbrood in the apiary, the authors conclude that foulbrood may be controlled with sulfathiazole when used carefully by experienced workers, but treatment may prove a long-term matter involving considerable time, labour, anxiety and uncertainty.

Growth and nutrition.

80. PEARCE, S. C.
The variability of apple trees. 1. The extent of crop variation and its minimization by statistical means.
J. hort. Sci., 1949, 25: 3-9, bibl. 10.

The variability in cropping of four series of apple trees was examined to see how it was affected by age of tree and length of experimental period. Coefficients of variability fell off with increasing length of experimental period and tended to decrease with increasing age of tree. Trees appear to settle down in variability after about 10 years from budding. Crop figures can usefully be adjusted using a covariance correction upon trunk girth at the beginning of the experimental period, but not if the treatments are applied right from the time of planting. In this case, no useful means of adjusting the figures was found. [Author's summary.] —East Malling Research Station, Kent.

81. GARDNER, V. R.
Type and variability in bud mutations of the cherry and apple.
Quart. Bull. Mich. agric. Exp. Stat., 1949, 32: 28-41, bibl. 4.

Type (as indicated by the mean) of a number of bud mutations of the cherry and apple, and of their parent "normal" forms, was determined by suitable measurements of lengths and weights and by recording maturity dates. Variability of these same forms was calculated and expressed in the form of standard deviations and coefficients of variability. The significance of the differences found was then determined by suitable statistical tests. The mutations that were studied readily fell into three groups or categories: (a) The majority of the bud mutations and their vegetative progeny were significantly more variable than their parent clones. Reversions and segregates are of rather frequent occurrence when these relatively variable bud mutations are propagated vegetatively. (b) A certain percentage, apparently less than a third, of the bud mutations in these fruits exhibit essentially the same degree of variability as their parent clones. (c) A third group, again apparently less than a third in the forms studied, exhibit significantly less variability than their parent clones. These relatively uniform strains are interpreted as being segregates from mixed or chimeral parent forms. Selection to fix type in bud mutations, especially those of the first category, is necessary if a relatively uniform variety or strain is desired. [Author's summary.]

82. PASSECKER, F.

Zur Frage der Jugendformen beim Apfel.
(On the problem of juvenile phases in the apple.)

Züchter, 1949, 19: 311-14, bibl. 2.

The article is a criticism of Kemmer's contention that a genuine juvenile phase does not occur in apples (*H.A.*, 18: 868). The author's own views and experimental results appear in his earlier papers [see *H.A.*, 18: 1625], and are summarized in his book on the propagation of fruit trees, etc. [*H.A.*, 19: 3536].

83. OSTERWALDER, A.

Die Wärmeansprüche unserer Obstfrüchte und Trauben von der Blüte bis zur Reife.
(The temperature requirements of fruits and vines from the time of blossoming to maturity in Switzerland.) [French summary 1½ p.]

Landw. Jb. Schweiz, 1949, 63: 687-718.

(1) For 6-8 years the author determined the temperature sum, i.e. the sum of the mean day temperatures, from the time of flowering to fruit maturity, for certain pome-, stone- and small-fruit varieties, several walnut varieties and 4 Swiss vine varieties, taking into account insolation and precipitation. (2) The temperature sums of the varieties examined varied from year to year by as much as 600° C. with late apple and pear varieties and with grapes. The following are the average temperature sums determined for apple: 1,277° C. (Beauty of Bath) -2,742° C. (Jonathan); pears: 1,642° C. (André Déportes) -3,027° C. (Glou Morceau); cherries: 883° C. (Frühkirsche) -1,221° C. (Géante d'Hedelfingen); plums: 1,452° C. (Ruth Gerstetter) -2,505° C. (Fellenberg); quinces: 2,540° C.; walnuts: 2,358° C.; strawberries: 450° C.; raspberries: 588° C.; Reimer's sand blackberry: 865° C.; currants: 1,223° C.; gooseberries: 1,348° C.; grapes: 1,839° C. (Elbling) -1,970° C. (Clävner). (3) Contrary to popular belief, it was found that with pome fruit and grapes rate of maturation and quality are not affected by the period of insolation but are determined only by temperature. Drought is known to accelerate maturation, but in a hot summer and autumn, as for instance in 1947, it is hardly possible to tell whether early fruit maturity is due to heat or drought. (4) The rates of growth and maturity are determined not only by the temperature sum but also by its distribution throughout the summer, since cool, wet weather may delay the ripening of some varieties. Although the temperature sum from May to October, 1948, was only 100° C. less than that of 1946, some apple varieties ripened 25 days later in the autumn of 1948 than in 1946. (5) In normal seasons it is possible to forecast the date of maturity once the average temperature sum of a variety has been worked out for a number of years. Such forecasts are more accurate with cherries than with apples, pears or grapes. (6) With apples and pears, early flowering is not associated with early ripening. (7) In normal seasons the date of flowering can be foretold approximately from a calculation of the temperature sum from March onwards, calculations from January onwards being valueless. (8) For apples and grapes the temperature sums from bud burst to flowering were found to vary from 240° to 306° C. and from 756° to 876° C. respectively. (9) The must weight of grapes expressed in degrees Öchsle, divided by the temperature sum from

flowering to maturity, was found to increase by 0.04°-0.085° Öchsle per 1° C. If only the period of sugar accumulation is considered (August and September), the quotient was 0.07° Öchsle per 1° C. [Abbreviated translation of author's summary.]—Full data are tabulated.—Wädenswil.

84. FRITZSCHE, R.

Der Wechsel von Tragjahren und Ausfalljahren bei unseren Obstbäumen. (Biennial bearing in Swiss fruit trees.)

Schweiz. Z. Obst- u. Weinb., 1949, 58: 397-400.

Biennial bearing has become a serious problem in Swiss fruitgrowing, especially in apples. The trouble was induced in 1945, when a spring frost killed the apple blossom, and has been accentuated since by severe drought in the off-years, 1947 and 1949. Control measures, such as thinning and manuring and pruning to stimulate shoot growth, are discussed.

85. GARDNER, V. R., MERRILL, T. A., AND TOENJES, W.

Fruit setting in the Delicious apple as influenced by certain post-blossoming environmental factors.

Spec. Bull. Mich. agric. Exp. Stat. 358, 1949, pp. 44, bibl. 63.

The authors' observations in southern Michigan in 1947-1949 confirm those of earlier workers that environmental conditions for a short period, especially the first 10 days, after full bloom are particularly important to fruit set. *Temperature*. It was found that the total effective (i.e. above 42° F.) day degrees in an area of light setting for the 7-day period following full bloom was 130-150, whereas for sections where setting was heavy enough to call for thinning day degrees were 200-250. *Sunlight*. In the light setting area total gram-calories of radiation received per square centimetre during the 7-day period averaged 2,550, in the heavy setting areas 3,000 to 4,000. *Sprays*. In most areas of heavy setting no fungicides were used. Wettable sulphur is found less toxic than lime-sulphur and less detrimental to fruit set. Certain copper-containing materials and Fermate are still less toxic. In 1949 the day degrees and sunlight were higher in the areas under observation and set was consequently much heavier.

Pruning and training.

86. VINCENT, A. E.

Winter pruning of canning peaches, on the Murrumbidgee Irrigation Area.

Agric. Gaz. N.S.W., 1949, 60: 309-14, illus.

The author discusses winter pruning of peaches with reference to (1) effects of hard cutting and limitation of limbs, (2) pruning the young tree, (3) importance of shape, (4) pruning the mature tree, (5) varieties which bear all along the lateral, and (6) tip-bearing varieties.

87. ZELENSKAJA, E. D.

The effect of pruning on the changes in the biochemical composition of apple trees. [Russian.]

Doklady vsesojuz. Akad. sel'sk. Nauk S.S.S.R., 1949, No. 10, pp. 41-4.

A study of the changes in the mobile carbohydrates in apple trees as affected by pruning. Analyses, at different times during the growing season, were made of branches and roots of apple trees, some of which had been subjected to hard pruning at the end of March and others left unpruned as control. The sugar content of branches after pruning increased at the beginning of the growing period. The branches, in the second half of summer, and the roots in the autumn, of pruned trees contained more starch than those of the controls. In early spring, up to the time of sap movement the branches removed by pruning contained a minimum quantity of plastic substances. In this period most of the stored nutrients (carbohydrates, nitrogen) are found in the roots with some in the stems. Pruning carried out up to the time of bud burst has a favourable effect on the tree, for it allows much of the nutritive substances to be maintained in the tree.

88. VAN OEVEREN, J. A.

Een nieuwe teeltwijze van appels. (A new way of training apple trees.)
Fruiteelt, 1949, 39: 716-18, illus.

The author describes his "hedge" system of training apple trees in which each row of trees is provided with 5 wires 40 cm. apart, to which the branches are attached and supported at 0.6 m. above the ground.

Manurial and soil problems.

89. SPRENGER, A. M.

Het centraal bemestingsproefveld voor de fruitteelt "De Lange Ossekampen" te Wageningen. (The central experimental fruit tree manuring field "De Lange Ossekampen" at Wageningen.) [English summary $\frac{1}{2}$ p.]
Meded. Dir. Tuinb., 1949, 12: 643-76, illus.

An account of the experimental field and of experiments under way. It is divided into three, namely the trial plot, laid out for plot experiments on the effect of applications of lime, P, K, and N; the old orchard where the effect of certain supplies of phosphatic and potassic fertilizers is being investigated; and lastly the new orchard, for trials of gradually increasing dressings with nitrogen. The results to date are discussed.

90. VAN DER KLOES, L. J. J.

Bemestingsproeven op perziken 1946 t/m 1948. (Fertilizer experiments with peaches 1946-1948.) [English summary 6 ll.]
Meded. Dir. Tuinb., 1949, 12: 633-42, bibl. 4, illus.

Fertilizer experiments with peaches growing in concrete tubs in a glasshouse covered by Dutch lights showed definite effect of nitrogen on vegetative growth, on blossoming and on yield. Potash affected blossoming and fruiting. Some slight effect of phosphate was noticeable.—Naaldwijk.

91. WILCOX, J. C.

Some factors affecting apple yields in the Okanagan Valley. VI. Contents of N, P and K in the terminal shoots.
Sci. Agric., 1949, 29: 424-36, bibl. 28.

In a previous paper in this series [see *H.A.*, 19: 909] the P, K and Ca contents of apple soils in the Okanagan

Valley were discussed. In the present paper the information obtained from analysis of the terminal shoots of apple trees in this area is presented. It was found that the application of N, P or K fertilizer had little effect on the N, P or K contents of the shoots. Indications were that the N, P and K contents of the shoots reflect variations in the respective nutrients in the soil less accurately when they are present in sufficiency than when they are present in deficient amounts. Shoot analysis has not revealed any deficiencies of P or K in Okanagan Valley apple orchards, although the existence of such deficiencies was suggested by soil analysis. It is concluded that shoot analysis is not very promising as a means of diagnosing the nutrient status of fruit trees.—Dom. Exp. Stat., Summerland, B.C.

92. ÖSTLIND, N.

Odlingförsök med fruktträd vid Alnarp 1938-1948. (Cultural trials with fruit trees at Alnarp 1938-48.) [English summary $\frac{3}{4}$ p.]
Medd. Trädgårdsförs. Malmö 54, 1949, pp. 153-72, bibl. 6.

Clean cultivation of apple, pear, plum and cherry was compared with sod culture and cover cropping with *Medicago lupulina*. The sod stunted growth so badly that a disc of 0.5 m. had to be dug out round every tree the year after its establishment. Even so yields were inferior to those of the other plots. Apples and cherries yielded best when clean cultivated (562 [10 years] and 270 kg. [7 years] respectively, as against 540 and 262 kg. under cover crops), while cover cropping agreed better with pears and plums (184 [8 years] and 755 kg. [8 years] respectively, compared with 143 and 667 kg. under clean cultivation). In one year the trees under cover crops suffered damage from the sawfly *Ametastegia glabrata*. The manifold data presented include sugar and vitamin C analyses.

93. KENWORTHY, A. L.

A nutrient-element balance chart.
Quart. Bull. Mich. agric. Exp. Stat., 1949, 32: 17-19, illus.

This chart, involving 5 concentric rings and 3 colours, has been designed to indicate the nutritional status of a tree as diagnosed by leaf analysis. It has been found useful in orchard surveys for growers and in the interpretation of experimental data. A coloured illustration of the chart is presented.

94. VACILJEV, V. I.

A new method of terracing mountain slopes. [Russian.]
Sad i Ogorod (Orchard and garden), 1949, No. 9, pp. 70-2, illus.

The usual method of terracing for fruit growing on steep slopes is laborious and costly. A new method is described by which the terraces are dug out gradually, with less labour and cost. The trees are planted along the contours as usual (4 m. apart as illustrated) and the soil is levelled in a circle (1 m. in diameter) around each trunk. The size of the circles is increased year by year until they unite and eventually, by the removal of the soil between them, the terrace is completed, in about 5 years. Above the row of trees soft fruit bushes are planted, particularly black currants, to help in preventing erosion while the terraces are being made.

95. SKPPER, A. H.

Contour furrow irrigation of orchards on the Murrumbidgee Irrigation Area to avoid uneven watering.

Agric. Gaz. N.S.W., 1949, 60: 471-5, 531-5.

The orchardists in the Murrumbidgee Irrigation Area have adopted a system of irrigation in which water is run down a number of furrows between each row of trees. This method if not correctly used may cause death or unthriftness of the trees and possibly permanent damage to the land. The author recommends contour furrow irrigation, by which a block is laid out in such a way that the rows of trees follow a set and constant grade throughout their length. The tree rows depart from the straight line whenever necessary to maintain the correct grade. In order to avoid unnecessary curves in the rows, all the minor high and low spots which can be easily graded out are corrected by grading, if possible prior to the setting out of the contour design. On hill slopes, where soil erosion is likely to occur, grassed waterways to dispose of drainage water should be established, preferably some time before the planting of the block, so that the grass cover can become established and the soil stabilized before the drain carries water.

Other cultural operations.

(See also 12, 27, 28, 36, 37.)

96. TOENJES, W.

The effect of trunk girdling on inducing earlier bearing of Northern Spy apple trees.

Quart. Bull. Mich. agric. Exp. Stat., 1949, 32: 23-7.

Twelve non-bearing trees were girdled on 25 May during their eighth year in the orchard, alternating trees in the same row being left as checks. The operation was accomplished by removing a strip of bark, $\frac{1}{8}$ in. in width, cut down to the wood and completely encircling the trunk, at 12 in. above the ground. Girdling was carried out again for a second and third time in the ninth and eleventh years. Additional 48 trees were treated on 18 June in their 11th growing year. The calculated yields per acre of the trees girdled repeatedly amounted to 203.5 bushels in their 9th, 10th and 11th years, as compared with 3.7 bushels from the controls. During the next 3 years the treated trees and controls produced 1,288 and 1,103 bushels respectively, which is equivalent to an increase of 16.8% in favour of the former, the total increase for the whole period being 385 bushels or approx. 35%. The total yield of the 48 trees girdled in their 11th year amounted to 1,881 bushels per acre for the following 3 years, as against 997 bushels from the controls, an increase of 18.5%. Girdling Northern Spy is considered profitable.

97. BOWMAN, F. T.

Thinning the on-year apple crop: the problem and methods.

Agric. Gaz. N.S.W., 1949, 60: 476-8, 484, bibl. 6.

The reason for thinning to prevent biennial bearing is discussed, and preparations for thinning are mentioned: 1. Caustic sprays (e.g. cresylic acid).—These sprays destroy blossom, but tend to russet the fruit to a greater

or lesser extent and must be carefully timed to full bloom application. 2. Wax-oil emulsions (e.g. Brytene, Brogdex).—Some of these are good thinners but too expensive and make subsequent coverage of trees with fungicides or insecticides very difficult. 3. Hormone-type sprays (e.g. 2,4-D, Methoxone).—In certain respects these have been shown to be practical fruit thinning sprays. They thin blossom or young fruit, without russetting or other injury to the remaining fruit. They do not have to be timed to full bloom stage and may be applied effectively at least until the calyx state. They can be mixed with arsenate of lead or DDT, and they are cheap, costing less than $\frac{1}{2}$ d. per tree.

98. ØHLERS, H.

Sprøjtning med hormoner mod frugtfald på æbletræer. (Spraying with hormones to control fruit drop in apples.)

Tidsskr. Planteavl., 1949, 53: 131-42, being *Beretn. Statens Forsøgsvirks. Planteakult.* 421.

Eight years' tests, in the course of which several proprietary hormone sprays were applied to 25 apple varieties, do not seem to warrant treatment for pre-harvest drop in Denmark under ordinary conditions. Certain varieties with a pronounced tendency to fruit drop, such as Rød Ananas and Guldberg, were found to benefit most from hormone applications. Experimental data are tabulated.

Grading.

99. ANON.

Grading too costly for you?

Fruitgrower, 1949, 108: 616, illus.

A description of the "Crossband Apple Grader", a new type of grader designed especially for the fruit-grower with a small acreage. It grades on a size basis, and can deal with 150-250 bushels of apples a day.

Noted.

100.

a BROOKS, R. M., AND OLMO, H. P.

Register of new fruit and nut varieties. List No. 4.

Proc. Amer. Soc. hort. Sci., 1949, 53: 573-88.

For previous lists see *Ibid.*, 45: 467; 47: 544; and 50: 426.

b BRY, A.

Impressions d'un voyage en Suisse. (Impressions of a tour [through the fruit growing areas of the Swiss cantons of Vaud and Valais, May 1949].)

Pomol. franç., 1949, 76: 94-104.

c DERMEN, H.

Are the pomes amphidiploids? A note on the possible origin of the pomoiidae.

J. Hered., 1949, 40: 221-2, bibl. 12.

d ERDMAN, L. W.

Legume inoculation: what it is; what it does. *Fmrs' Bull. U.S. Dep. Agric.* 2003, 1948, pp. 20, illus.

e REBOUR, H.

Situation de la culture du figuier en Algérie. (Fig growing in Algeria.)

C.R. Acad. Agric. Fr., 1949, 35: 584-6.

SMALL FRUITS, VINES AND NUTS.

(See also 100a, 476, 485.)

Small fruits.

101. READ, F. M.

Berry fruits in England and America.*J. Dep. Agric. Vict.*, 1949, 47: 289-300.

Observations made by the author during a visit to England, Canada and the United States in 1948.

102. LECRENIER, —, DERMINE, —, AND TILKIN, N.

De vermenigvuldiging van de kleine fruitsoorten. (The multiplication of small fruit varieties.)

Landb. Tijdsch., 1949, 2: 783-95.

This article reviews the points that have a bearing on the propagation of small fruits, viz. (1) diseases and pests with brief descriptions and control measures, (2) general control measures for virus diseases, (3) identification of varieties by their vegetative characters, and (4) propagation technique.

103. WILLIAMS, C. F., SMITH, B. W., AND DARROW, G. M.

A Pan-American blackberry hybrid.*J. Hered.*, 1949, 40: 261-5, bibl. 7, illus.

During the years 1941 to 1946 many attempts were made at the North Carolina Agricultural Experiment Station to hybridize the Andean blackberry (*Rubus glaucus*), which is very resistant to anthracnose and leaf spot diseases, with several varieties of American red and black raspberries and with Lucretia and Young dewberries. The resulting hybrids, some of which combined the disease resistance of the Andean blackberry with the hardness of the American varieties, are described. All the hybrids were sterile, but this was due to the unwitting use of tetraploid material. The dominance of disease resistance in the triploid hybrids suggests that it would be desirable to obtain fertility by doubling the chromosomes of the hybrids rather than by developing tetraploid plants of the American parents before crossing.

104. JOHANSSON, E.

Sortförsök med hallon vid Alnarp 1937-1948.

(Variety trials with raspberries at Alnarp 1937-48.) [English summary 1½ p.]

Medd. Trädgårdsförs. Malmö 56, 1949, pp. 215-28, bibl. 10.

In two trials carried out on a light loam soil rich in humus, but with a high pH value, the Dutch variety St. Walfried showed the highest mean yield of 84 and 70 kg. per 100 m² in 1939-45 and 1942-48 respectively, followed by Lloyd George with 76 and 65 kg., the difference not being significant. Both varieties became more and more affected by virus diseases, while Baumforth B remained healthy and produced berries of a good flavour. The latter variety, however, cannot be recommended for commercial planting owing to its comparatively low yields (56 and 47 kg.).

105. STEINIG.

Johannisbeere "Heinemanns Rote Spätlese" hat sich bewährt. (The red currant variety

Heinemanns Rote Spätlese has stood the test.)

Gartenwelt, 1949, No. 17, p. 253.

The variety ripens in August. It has large racemes and long annual shoots, and is disease-resistant. O.J.

106. MINISTRY OF AGRICULTURE, LONDON.

Strawberries.*Bull. Minist. Agric. Lond.* 95 (4th edition), 1949, pp. 38, illus.

Very little has been added to the 3rd edition of this bulletin on commercial strawberry production, brought out in 1947 [for abstract see *H.A.*, 17: 1251]. There special emphasis was laid on the problem of virus degeneration and the importance and propagation of healthy stock. The 4th edition brings up to date information on the tested clonal stocks raised at East Malling. In addition to Royal Sovereign M.40, Huxley M.44 and Oberschlesien M.42, tested clonal stocks of Perle de Prague M.45 and Auchincruive Climax M.46 are now available and acceptable as parent plants for Special Stock Certificate runners [see also 119b]. Within the last 2 years the red core resistant variety Climax has established its value sufficiently well to be included in the short list of commercially grown varieties. The only other changes in this edition are in the chapter on pest and disease control, where a paragraph on eelworm infection is included, and where an application of benzene hexachloride dust is recommended as a routine dressing on runner beds for control of wireworms and chafer grubs.

107. VAN DEN MUIJZENBERG, E. W. B.

Kweekwijzen voor de oogst van aardbeien in de herfst. (The culture of strawberries for autumn fruiting.)

Tuinbouw, 1949, 4: 95-8, illus.

For obtaining ripe strawberries in the autumn the plants must receive short-day treatment during summer, 10-12 hours of light per day during 2-6 weeks in May and June, 100 days elapsing between starting the treatment and the time when the first fruits ripen. The treatment can be made by covering the frames with light-proof mats from about 6 p.m. to 7 a.m. If the short-day treatment is started in the second half of June the fruiting can be hastened, and mildew checked by electrical heating in October. From runner plants a first picking can be got in autumn, a second in spring and a third the following autumn.

108. ROGERS, W. S.

Sovereigns suffer a set-back.

Fruitgrower, 1949, 108: 850-1.

A condensed version of a paper read at the Lincoln Soft Fruit Conference in November, 1949, in which some modern problems of strawberry growing are discussed. In particular the present position of certified strawberry stock is analysed. The author urges the need for the early establishment of a Nuclear Stock Centre, where all plants subject to virus can be raised under the best possible conditions for disease and pest control.

109. BAKER, R. E., AND VOTH, V.

Breeding and testing strawberry varieties.*Bull. Calif. agric. Exp. Stat.* 714, 1949, pp. 16, illus.

The authors report on the characteristics, adaptability and horticultural value of the 5 strawberry varieties,

Shasta, Sierra, Lassen, Tahoe and Donner, that were introduced by the University of California in 1945, in the light of 4 years further trial in various areas of production in California. They also introduce 2 new selections, Campbell and Cupertino, which have shown promise in experimental plots and in a number of small commercial plantings.

Vines.

(See also 462.)

110. BIRON, M.

Kuntra. (The Kuntra grape.)

Progr. agric. vitic., 1949, 132: 129-33.

A brief account of the viticulture of Bozca-Ada (Tenedos) and Imbros, two islands near the entrance to the Dardanelles, with particular reference to the Kuntra grape, which constitutes 80% of the production of Bozca-Ada. This variety, which yields a red wine, is said to be resistant to fungal diseases (oidium, mildew, etc.) in spite of the nocturnal humidity of the air, and the shoots withstand dry conditions and strong winds.

111. BAŠIROV, F. B.

The rapid development of grapevines. [Russian.]

Vinodelie i Vinogradarstvo (Wine-making and viticulture), 1949, No. 10, pp. 14-19, illus.

Measures are discussed for re-establishing vines of which the above-ground parts have been killed by frost, and a description is given with illustrations of a method of training which consists primarily of 3 branches arising from buds at ground level, two of them trained obliquely, the third vertically and then pinched back at 1.25 to 1.5 m. to allow two secondary branches to form a secondary tier of shoots.

112. ANON.

Outdoor grapes are easy to grow.

Fruitgrower, 1949, 108: 578-9, illus.

An experiment in outdoor grape production, made by a private grower at Molash, Kent, is described. As the vines are only 3 years old and have not yet produced a full crop, no results are available, but some suggestions are made concerning pruning, choice of site and choice of varieties. For commercial wine production the varieties Seyve-Villard 5.276 and Gamay Hatif des Vosges are recommended for English conditions.

113. PIROVANO, A.

Nouveaux raisins sans pépins. (New seedless grapes.)

Bull. hort., 1949, 67th year, 4: 131-3, abstr. in *Ann. Gembl.*, 1949, 55: 162.

The author has long been trying to produce a seedless grape with large berries and good colour, resistant to mildew and of good commercial quality. He crossed Black Sultanine with the white variety Sciamblese: among the progeny appeared a variety Pardina, almost seedless and with a pink-spotted skin. Two promising varieties, Maria Pirovano and Rodi, resulted from the cross White Sultanine × Muscat of Alexandria.

114. BASTELEUS, R.

De Cannon Hall, koningen der druiven. (Cannon Hall, queen of grapes.)

Cult. Hand., 1949, 15: 484-7.

The Cannon Hall variety of white table grape is

described in some detail. It is said to be of high quality (appearance, taste, and sweetness), and very suitable for greenhouse culture, but to need specialist care.

115. LE ROUX, M. S.

Handling and packing of table grapes.

Fmg S. Afr., 1949, 24: 447-9, illus.

The author, of the Fruit Research Station, Stellenbosch, stresses the necessity of proper equipment and careful handling in the packing-house, and offers a few hints on grape packing.

Nuts.

(See also 131, 453, 493.)

116. GAYFORD, G. W.

Walnut growing in Victoria.

J. Dep. Agric. Vict., 1949, 47: 311-12, illus.

The suitability of the various districts of Victoria for walnut growing is discussed. Many of the trees growing in Victoria are seedlings which produce nuts of variable quality, and so cannot generally be recommended. The rootstock most suitable for propagation is the Northern Californian Black (*Juglans hindsii*) which produces vigorous trees. The varieties which have proved most satisfactory are Franquette, Myrtleford Jewel and Treyve Mayette.

117. MINISTÈRE DE L'AGRICULTURE, PARIS.

La noix de Grenoble. (The Grenoble walnut.)

[Publ.] *Minist. Agric. Paris*, 1949, pp. 20, illus.

A pamphlet advising walnut growers and salesmen in the district of Grenoble on how to maintain the high standard of their produce. Recommendations are made concerning orchard practices, such as manuring and spraying, and marketing practices, including preparation, grading and packing of the nuts.

118. GUERREIRO, M. G.

Estudos realizados no castanheiro em 1948.

(Chestnut studies.)

Bol. Junta nac. Frut. Lisboa, 1949, 9: 13-40, illus.

This report describes measures that are being taken for the development and protection of Portuguese chestnut woods, particularly with reference to vegetative propagation and the crossing of Portuguese and Japanese species with the object of raising trees resistant to the "ink disease" caused by *Phytophthora cambivora*.

Noted.

119.

a MANNING, W. E.

The genus *Carya* in Mexico.

J. Arnold Arbor., 1949, 30: 425-32.

b MINISTRY OF AGRICULTURE, LONDON.

Register of growers of certified strawberry plants, 1949.

[Mimeo.] *Minist. Agric. Lond.* DM11652/1, pp. 30.

c PEYER, E.

Der Rebbau und die genossenschaftliche Weinverwertung in Luxemburg. (Viticulture and co-operative vine marketing in Luxemburg.)

Schweiz. Z. Obst- u. Weinb., 1949, 58: 415-17, 442-6.

PLANT PROTECTION OF DECIDUOUS FRUITS.

(See also 1, 6, 106, 480, 486.)

Nutritional disturbances.

(See also 26, 29, 30-34, 48a.)

120. HILL, H.
Minor element deficiencies affecting Canadian crop production.
Sci. Agric., 1949, 29: 376-84, bibl. 38.
The extent to which minor element deficiencies occur in Canadian agriculture, the work that has been done on the problem, and the control measures recommended are outlined. The crops mentioned are mainly horticultural.
121. MULDER, D.
Voedingsziekten van vruchtbomen. (Nutritional diseases of fruit trees.) [English summary 9 ll.]
Tijdschr. PLZiekt., 1949, 55: 272-8, bibl. 5.
A general account of nutritional disorders in fruit trees with remarks on the time of their appearance. The value of chemical leaf analysis in the solution of fertilizer problems is indicated.
122. MULDER, D.
Voedingsziekten van vruchtbomen. (Nutritional diseases of fruit trees.) [English summary $\frac{1}{2}$ p.]
Meded. Dir. Tuinb., 1949, 12: 594-606.
Causes and symptoms of nutritional diseases in Holland, viz. deficiencies of potash, magnesium, iron, manganese, copper, zinc, and nitrogen, are reviewed, and attention is given to the soil types on which they are most apparent. Chlorosis, necrosis and defoliation are symptoms of magnesium deficiency, and chlorosis may also indicate shortage of iron, manganese and zinc, while zinc deficiency may also cause little leaf and rosette disease. Copper shortage causes dying off of branches in summer. In some cases repeated spraying with borax has been successful against bitter pit in apples, and hence it is probable that this defect is connected with boron deficiency. Remedies suggested are improvement of soil by organic manures, fertilizer dressings, injection, or spraying.
123. McLARTY, H. R., AND WOODBRIDGE, C. G.
Boron in relation to the culture of the peach tree.
Abstr. in *Phytopathology*, 1949, 39: 860.
Peaches grown on virgin soils in the Okanagan Valley of British Columbia may suffer from boron deficiency, the symptoms being the failure of the buds to break in the spring, and dying of twigs, branches, and sometimes of the entire tree. When too much boric acid is applied as a remedy, toxicity symptoms may occur, a slight excess producing small necrotic areas on the midrib or lateral veins of the leaves, while heavier applications may cause dying of terminal growth, yellowing of the foliage, severe cankering of the twigs and small branches, and malformation of the fruit.
124. BOULD, C., AND OTHERS.
Zinc deficiency of fruit trees in Britain.
Nature, 1949, 164: 801-2, bibl. 10.
In the summer of 1948 the authors' attention was

drawn to a serious failure of apple trees on a plot in the National Fruit Trials at Wisley. On affected trees the shoots showed sparse foliage and typical short internodal growths with leaf rosetting and shoot die-back; the leaves were much reduced in size and tended to be lanceolate with diffuse interveinal chlorosis. The condition of badly affected pears was found to be similar, a striking feature being the large proportion of dead bark tissue on the main stems. Analyses of leaves and shoots of apple trees showing symptoms of little leaf revealed acute zinc deficiency, the leaves of Laxton Pearmain, for instance, containing 1.2 p.p.m. Zn as compared with one of 9.6 p.p.m. in healthy trees. Wisley surface soils were found to contain 1.2 μ gm. Zn per gm. air-dry soil, as against 10 μ gm. Zn in the soils of healthy apple plantations at Long Ashton. Zinc spray and injection treatments of apple trees at Wisley, applied in summer and during the dormant season, resulted in the appearance of normal shoots and leaves in 1949.

125. COLE, C. E.
Pitting disorders in pears.
J. Dep. Agric. Vict., 1949, 47: 317-20, illus.
The various forms of pitting in pears in Victoria are described under boron deficiency, hail marks, stony pit (virus), and lithiasis. The commonest type appears to be stony pit which is transmissible by budding and grafting, and recommendations are based on avoiding transmission in those ways.
126. KATZ, M.
Sulfur dioxide in the atmosphere and its relation to plant life.
Industr. Engng Chem., 1949, 41: 2450-65, bibl. 122.
Sulphur dioxide from industrial gases in low concentrations is widely distributed in the atmosphere. In exposures of sufficient duration to concentrations higher than about 0.40 p.p.m. it may be toxic to sensitive plants at periods during the growing season when physiological activity is high and the conditions for rapid absorption of this gas by the leaves are at a maximum. However, low concentrations, in the range up to 0.10 to 0.20 p.p.m., have been demonstrated to be without influence on plant life, in the absence of visible markings. There is no effect, in this case, after long-continued exposure on rate of growth, yield of crop, photosynthesis, respiration, or on the daily march of the stomata. The effects may be beneficial if the plants are growing in a sulphur-deficient soil or nutrient. No basis has been found for the theory of invisible injury. It is hoped that the methods and results described will serve as a guide in investigations of effects of other industrial waste gases on plant life. [From author's summary.]—Defence Res. Chem. Laboratories, Ottawa, Canada.

Climatic factors.

127. SIPKES, C.
Wind en windschade in de tuinbouw. (Wind and wind damage in horticulture.)
Tuinbouw, 1949, 4: 154-6, illus.

Discusses the properties, as windbreaks, of a number of bushes and trees.

128. PROKOFEV, C. P.

Woodland strips for protecting plantations of small fruits. [Russian.]

Sad i Ogorod (Orchard and garden), 1949, No. 8, pp. 14-17, illus.

The advantages and disadvantages of species of trees used for windbreaks in the neighbourhood of Moscow are discussed, particularly with regard to poplar, lime (*Tilia*), birch, larch, maple, fir, wild apple and pear, acacia and hawthorn. A system of planting windbreak trees is laid down and recommendations are given for treating the trees afterwards. The advantages resulting from the use of shelter belts for small fruits are supported by figures.

129. HANSEN, C. M., GARDNER, V. R., AND FARRALL, A. W.

Protecting plants from frost injury through the use of radiant energy.

Quart. Bull. Mich. agric. Exp. Stat., 1948, 32: 94-103, illus.

Accurately controlled tests show conclusively that the infra-red radiant-type frost control method is very effective in protecting low-growing crops such as tomatoes and strawberries. The area which can be protected per machine of present design will vary with the conditions. Under tomatoes about 0.7 acre per machine was protected when the minimum temperature was 29° F., which [in Michigan] during many years would be the minimum temperature for which protection would be necessary. At 20° F. the protection of tomatoes was only for a radius of about 30 feet. On the other hand, with strawberries there was good protection at a 50-foot radius when the temperature was 21° F. and there was some protection well beyond this radius. The infra-red radiant-type frost protection machine is the best means known at the present time for large-scale frost protection. [From authors' summary.] It is suggested that investment in this type of machine is justified where its use is contemplated for the protection of a variety of crops both in spring and autumn.

130. BAUMGARTEN, A.

Kann der Winterschnitt Frostschnaden bewirken? (The effect of winter pruning on frost injury.)

Dtsch. Gart., 16 April, 1949, p. 13.

The winter pruning of young trees should be postponed until after the worst cold may be expected to be over. In the winter of 1946/47 the author found in his own nursery that early pruning of young trees, including those on hardy stem builders, was followed by 90% frost injury, while trees pruned later remained unaffected. O.J.

131. OZOL, A. M.

Winter-resistance of the persian and other walnuts. [Russian.]

Doklady Akad. Nauk S.S.S.R., 1949, 66: 725-8.

Observations on winter injury to walnuts are recorded. The author concludes that in the Moscow region *Juglans mandshurica* and *J. cinerea* are most resistant

to frosts, *J. nigra* and *J. cordiformis* next in order, and *J. regia* least resistant.

132. JEFFERY, C. W.

Dinitro-cresol for controlling delayed foliation.

Fmg S. Afr., 1949, 24: 431-6, bibl. 8, illus.

One of the main problems of the deciduous fruit growing industry in South Africa is that of delayed foliation and blossoming, a phenomenon that occurs where the winter temperatures are insufficiently low for the varieties concerned. Tests were carried out in the Western Province to determine whether dinitro compounds would effectively break the dormancy of pome and stone fruits. When added to a dormant oil spray, DNC markedly increased the efficiency of the spray against delayed foliation, especially in the warmer areas. It caused earlier blossoming and foliation of apples and pears and shortened the blossoming period. DNC treatment also caused a higher percentage of leaf bud development than oil treatment alone. In areas where delayed defoliation was normally severe, DNC treatment resulted in a larger apple and pear crop and in the development of a higher percentage of apple flower buds. Moreover, the critical period for DNC treatment is not so short as that for oil. Storage tests with pears, however, showed that Bon Chrétiens from treated trees did not ripen properly in cold storage; other varieties behaved normally. On prunes (European plum) results were equally satisfactory. An aqueous solution of DNC powder only was tested on peaches, as peach trees are susceptible to oil damage. This had some stimulating effect, but was very little more effective than lime-sulphur. There are indications that the addition of a sticker might increase the efficiency of this aqueous spray. Spray strengths for all species are provisionally recommended.—Fruit Research Station, Stellenbosch.

Virus diseases.

(See also 108.)

133. BALDACCI, E., AND OTHERS.

Relazione sui dati e le esperienze circa la "moria" del pero nella Venezia Tridentina. (Report on the incidence and phenomena* connected with moria [die-back] in pears in the Trentino and Alto Adige districts of Italy.)

Not. Mal. Piante, 1949, No. 4, pp. 50, bibl. 27, illus.

The report of a commission appointed to investigate "moria" in pears in a large district of North-East Italy. The economic importance of the disease is noted and its symptoms are described. Histopathological data are recorded from the cambial and pericambial layers and the geographical distribution of the disease is discussed. All the various theories on the phenomenon are discussed and in particular the possible effects of environment, climate, soil, and finally of cultural practice on its incidence. The possibility of virus origin is examined with great care, and in this connexion the stock/scion relations are considered. Methods of control, though yielding scant results to date, are considered. In conclusion

* Translation of passage dealing with symptoms available.

indirect evidence points to virus origin and indicates that moria is most likely to occur when certain scions are used with certain rootstocks.

134. VAUGHAN, E. K.

Raspberry yellow rust control.

Abstr. in *Phytopathology*, 1949, 39: 863.

Plants sprayed with lime-sulphur or Phygon-XL had the least amount of yellow rust (*Phragmidium rubi-idaei*). Elgetol, Cop-O-Zink, and Fermate gave almost equally good control.

135. DeLONG, D. M., AND SEVERIN, H. H. P.

Characters, distribution, and food plants of leafhopper vectors of virus causing Pierce's disease of grapevines.

Hilgardia, 1949, 6: 171-86, bibl. 25, illus.

The distinguishing characters of 10 of the 14 species of leafhoppers reported as vectors of the virus are here described, and the chief host plants in California listed.

G.K.A.

136. SEVERIN, H. H. P.

Life history of the Blue-green Sharpshooter, *Neokolla circellata*.

Hilgardia, 1949, 6: 190-202, bibl. 4.

This leafhopper is one of the more important vectors of the virus causing Pierce's disease of grapevines.

G.K.A.

137. SEVERIN, H. H. P.

Transmission of the virus of Pierce's disease of grapevines by leafhoppers.

Hilgardia, 1949, 6: 190-202, bibl. 40.

Transmission tests were carried out on nine reported vectors and several other species of leafhopper. As the same virus causes "dwarf" of alfalfa this plant was included in both direct and interplant transmission tests.

G.K.A.

Bacteria.

(See also 48k.)

138. HUTTON, K. E.

Crown gall of plants.

Agric. Gaz. N.S.W., 1949, 60: 467-9.

Crown gall (*Agrobacterium tumefaciens*) is described, with particular reference to its occurrence on fruit trees, and the following control measures are recommended: (1) no infected plants should be planted out, (2) when plants are removed on account of crown gall, replanting should only be made subsequent to soil treatment; 2 to 3 lb. of sulphur, well worked into the soil some weeks prior to replanting, will minimize risk of infection on young trees, (3) galls may be removed from the crown of established stone fruit trees by treatment with Dinoc and methylated spirit (1 part of Dinoc to 4 of methylated spirit); the gall is chipped off (the pieces burned) and the galled area painted with the mixture, painting to about $\frac{1}{2}$ in. on to the healthy bark; leave it exposed for one month, repaint, and cover with soil.

139. NOVOGRUDSKIA, D. M.

Mycolytic bacteria of the genus *Pseudomonas*. [Russian.]

Izv. Akad. Nauk S.S.S.R. Ser. Biol., 1949, No. 2, pp. 237-59, bibl. 16, illus.

An account of *Pseudomonas* spp. which have an antibiotic action against certain soil fungi including some

which attack crop plants, e.g. *Rhizoctonia solani* and *Verticillium* spp.

140. TOENJES, W.

Occurrence of fire blight in Bartlett pears as influenced by certain cultural practices.

Quart. Bull. Mich. agric. Exp. Stat., 1949, 32: 143-8.

Fire blight of pears is of considerable economic importance in North America, especially on fertile, loamy soils, where the growth of the younger, non-bearing trees is luxuriant. In trials carried out at the Graham Experiment Station with the variety Bartlett from 1920 to 1944 it was shown that both incidence and severity of the disease can be markedly reduced by cultivation practices designed to avoid excessive growth. The method adopted was to put down in the fourth year a sod of alfalfa, which later gave way to bluegrass, and to mulch the trees with the alfalfa and grass cuttings after mowing. In the check plot the normal clean culture-cover crop system was practised for the duration of the experiment. Conditions for fire blight infection were favourable in 1929 and the disease went rampant. Fourteen of the 24 trees of the clean culture-cover crop plot were so seriously infected that they had to be removed, while only 3 out of 48 trees were similarly damaged in the sod-mulch plot. From 1930 onwards regular inspections were undertaken at which all blighted tips and branches were cut out at a point 12-18 in. below the lowest point of visible infection. During the period 1930-39 a greater total number of blighted twigs and branches had to be removed from the check plot than from the sod-mulch plot. During the last 5 years, however, the few blighted twigs occurring were scattered uniformly throughout trees in both plots. Yield figures are not given.

141. ARK, P. A., AND DICKEY, R. S.

Control of walnut blight by sprays in 1947 and 1948.

Abstr. in *Phytopathology*, 1949, 39: 858.

From the results obtained it appears that ammoniacal copper (containing from 0.3 to 0.6% metallic copper in a final spray), copper A (1.35% metallic Cu in a final spray), and yellow cuprocide (1.66% metallic Cu in a final spray), give good practical control of the disease with good increase in yield, in comparison with unsprayed trees, and do not induce visible injury.

142. DE ROPP, R. S.

Inhibiting action of some analogues of folic acid on the growth of plant tumours.

Nature, 1949, 164: 954, bibl. 6.

Five analogues of folic acid, which are capable of inhibiting the growth of animal tumours, were found to inhibit also the growth of tumours on carrot tissue induced by crown gall bacteria. It is suggested that carrot fragments are convenient test objects for the screening of compounds for their action against crown gall.—New York Botanical Gardens.

Fungi.

143. BIER, J. E.

Some common tree diseases of British Columbia.

[Publ.] *Dep. Agric. Canada, Div. Bot. Pl. Path., Sci. Serv.*, 1949, pp. 48.

Included are certain fungi that attack not only forest trees but also fruit trees and bushes, e.g. White pine blister rust [*Cronartium ribicola*], *Emilia mellea*, *Polyporus sulphureus* and *S. squamosus*.

144. COMMONWEALTH MYCOLOGICAL INSTITUTE.

Distribution maps of plant diseases.

Commonwealth Mycological Institute, Kew, Surrey, 1949.

Recently revised maps of horticultural interest are:—

180. *Plowrightia ribesia* (Fr.) Sacc. on currant and gooseberry.
181. *Puccinia psidii* Wint. on guava, pimento, etc.
183. *Cycloconium oleaginum* Cast. on olive.
184. Cassava mosaic virus on cassava.
185. *Leptosphaeria coniothyrium* (Fuckel) Sacc. on rose (*Rosa* spp.), raspberry, etc.
186. *Physolepora tucumanensis* Speg. on sugar cane.
187. *Pseudopeziza ribis* Kleb. on currant and gooseberry.
188. *Clasterosporium carpophilum* (Lév.) Aderh. on peach, almond, etc.
189. *Mycosphaerella brassicicola* (Duby) Oudem. on cabbage, cauliflower, etc.
190. *Colletotrichum atramentarium* (Berk. & Br.) Taubenh. on potato and tomato.
192. *Taphrina deformans* (Berk.) Tul. on peach, almond and nectarine.

145. BORZINI, G.

Una malattia del melo causata da un basidiomicete indeterminato. (An apple tree disease caused by an undetermined basidiomycete.)

Not. Mal. Pianta, 1949, No. 1, pp. 5-8, bibl. 1, illus.

A disease resembling "papery bark disease" [*H.A.*, 13: 1273; 14: 1600] has been observed in Italy. The author isolated, from diseased tissues, a basidiomycete with mycelium different from that of *Stereum purpureum*.—Laboratorio Crittogamico Italiano—Pavia.

146. MULDER, D.

Aantasting van sierappels door appelschurft (*Venturia inaequalis* (Cooke) Wint.). (Scab attack (*Venturia inaequalis*) on ornamental *Malus* species.) [English summary 12 ll.]

Tijdschr. PlZiekt., 1949, 55: 242-5, bibl. 8.

Observations on 52 species, varieties and hybrids of ornamental *Malus* species showed that those which can be grouped in the section *Sorbomalus* were resistant to scab with only one doubtful case. A table shows the distribution of resistance to scab amongst 36 species and varieties. This correlation between taxonomy and scab attack may be important in breeding scab resistant apple varieties.

147. KOSTJUK, P. N., AND RAČKOV, V. M.

The effect of mould fungi on vine buds. [Russian.]

Vinodelie i Vinogradarstvo (Wine-making and viticulture), 1949, No. 10, pp. 24-5.

Various moulds have been found on dead vine buds of stems covered with soil during winter to protect them from frost. As the fungi are to be found when

temperatures have not been low enough to cause frost injury it is assumed that the fungi are responsible for the damage. Attempts to control the injury were made by applying fungicides to the stems in autumn prior to their being covered over. The best results were given by 1% iron sulphate.

148. VIENNOT-BOURGIN, G., AND DELASSUS, —.

Recherches sur le papery bark canker du pommier en France. (Papery bark canker of apple trees in France.)

C.R. Acad. Agric. Fr., 1949, 35: 577-8.

Papery bark canker of apple trees [*H.A.*, 13: 1273; 14: 1600] is mentioned as occurring in France. In the pith and surrounding tissues of affected trees the authors found fungal hyphae, and a *Cylindrosporium* (not yet specifically named), which is considered to be parasitic, was isolated.

149. ARNAUD, G.

Une nouvelle maladie des plantes horticoles. (A new disease of horticultural plants.)

C.R. Acad. Agric. Fr., 1949, 35: 496-7, bibl. 4.

Cylindrocladium scoparium, a fungus which attacks a number of horticultural plants in other countries [*H.A.*, 15: 100, 1743, and 19: 319i] is recorded as occurring on ivy in France.

150. THIOLLIÈRE, J.

Le coryneum du pêcher. (The peach coryneum disease.)

Pomol. franç., 1949, 76: 10-12.

A description of the shot hole disease of peach (*Coryneum beyerinckii*) and its control by copper-containing preparations or by lime-sulphur. The varieties of peach most subject to attack in France are May Flower, Hale's Early, Early Elberta, and Amsden.

151. TAVEIRA FERNANDES, C.

A campanha contra a "doença da tinta" dos castanheiros no ano de 1948. (Control measures against the "ink disease" of chestnuts in 1948.)

Bol. Junta nac. Frut. Lisboa, 1949, 9: 41-66, bibl. 6, illus.

In inoculation tests carried out with various *Phytophthora* spp. the fungi proved to be highly parasitic. The resistance of hybrids of *Castanea sativa* × *C. crenata* was tested.

Mite and insect pests.

(See also 244.)

152. CUTRIGHT, C. R.

The use of acaricides in concentrate form. *J. econ. Ent.*, 1949, 42: 363-5.

Numerous acaricides used at 5 and 10 times normal concentrations gave control of the European red mite equal to that obtained by conventional spraying with high pressure. Damage to fruit and foliage was noted in only one instance, and in this case it was no greater than that produced by high pressure spraying. [From author's conclusions.]—Ohio Agric. Exp. Stat., Wooster.

153. DESRUE, A.
Le problème de l'araignée rouge. (The red spider problem.)
Pomol. franç., 1949, 76: 87-8.
The ravages of red spiders (*Tetranychus* spp.) in the orchard, vineyard, and market garden are mentioned and the difficulty of controlling them, particularly with reference to the new synthetic insecticides which destroy their parasites, is pointed out. Trials are briefly described in which a powder, miscible in water, containing 5% thiophosphate of diethyl and paranitrophenyl, used as a 0.5% spray with a wetter, applied in August (repeated twice on apples and once on pears), completely freed the leaves of treated trees from adult spiders in 20 days, while controls were severely infested.
154. ENTOMOLOGICAL BRANCH, N.S.W. DEPARTMENT OF AGRICULTURE.
Aphids or plant lice (*Aphididae*).
Agric. Gaz. N.S.W., 1949, 60: 373-8.
An account of the aphids infesting fruit trees and vegetables in New South Wales with recommended control measures.
155. HALLEMANS, A.
Overwintering van *Aphelinus mali* het bloedluis-parasietje en zijn gevoeligheid voor sproeimiddelen. (The overwintering of *Aphelinus mali*, the woolly aphis parasite and its susceptibility to injury from spray materials.)
Cult. Hand., 1949, 15: 615, illus.
The harmful effect of synthetic insecticides on the apple woolly aphis parasite, *Aphelinus mali*, is pointed out. To ensure supplies of the parasite it is recommended that shoots bearing parasitized woolly aphids be stored over winter in a fresh cool place and hung on the trees in May. The new organic phosphoric acid derivatives have little effect on the woolly aphis but are injurious to the parasite.
156. HARRIS, W. B.
Control of woolly aphis: trial of H.E.T.P. and E.605.
J. Dep. Agric. S. Aust., 1949, 52: 597.
The results suggest that E.605 (parathion) at the strengths used (0.005, 0.01, and 0.015%) is more effective than HETP (1 pt. in 150, 100, and 75 gal.) and that the optimum strength for E.605 for the control of woolly aphis is at least 0.015%, at which strength it is approximately as effective as nicotine sulphate plus white oil at standard strength.
157. VASSEUR, R.
Quelques données sur la biologie du pou de San José (*Quadraspidiotus perniciosus* Comst.) dans la Région Lyonnaise. Perspectives nouvelles de la lutte chimique. (Notes on the biology of the San José scale in the Lyons region. Promising results of chemical control.)
Pomol. franç., 1949, 76: 47-51, illus.
In the Mediterranean coastal regions of the south of France and Italy the San José scale produces 4 or 5 generations during the year. Good control has been obtained in trials with a winter oil containing DNOC and with white summer oil containing DDT.
158. GEIER, P., MATHYS, G., AND BOVEY, P.
Contribution à la connaissance des conditions d'action de l'acide cyanhydrique (HCN) sur le pou de San-José (*Quadraspidiotus perniciosus* Comst.), en cellules étanches et à pression atmosphérique. (The action of HCN on the San José scale in airtight chambers and at atmospheric pressure.) [Summary in German.]
Ann. agric. Suisse, 1949, 50: 543-56, bibl. 9.
The experiments here described were made by workers of the Lausanne Research Station using airtight metal chambers. Among the conclusions reached are, that HCN treatment even at concentrations above 7.5 g. HCN/m³ can be given in winter in hermetically sealed chambers, which are provided with means for circulating the gas, without danger of harming infested plants and that for practical purposes a dose of 5 g. HCN/m³ for 30 minutes can be recommended. This affords an adequate safety margin.
159. WOODSIDE, A. M.
Tests of insecticides for control of cat-facing on peaches.
J. econ. Ent., 1949, 42: 335-8.
Sprays were more effective than dusts in reducing cat-facing of peaches. Experiments showed that DDT, at the rate of 2 lb. of 50% wettable powder per 100 gal., applied either at full bloom or at petal fall, gave a satisfactory control of the insects that cause cat-facing. Sabadilla, at the rate of 4 lb. of 50% powder per 100 gal., was about as effective as DDT. Benzene hexachloride, chlordan, and chlorinated camphene were less effective. There was little difference in the value of the full-bloom and the petal-fall spray, and two sprays gave only slightly better results than one. In some seasons the petal-fall spray may be too late to prevent damage by the tarnished plant bug. [From author's summary.]—Virginia Agric. Exp. Stat., Staunton.
160. CARLSON, F. W., AND NEWCOMER, E. J.
Control of pear psylla in the Pacific Northwest.
J. econ. Ent., 1949, 42: 338-42, bibl. 3.
Of the materials tested on a large scale in 1947 and 1948 for control of the pear psylla, *Psylla pyricola*, parathion, chlorinated camphene, rotenone and nicotine sulphate, were very effective as foliage sprays. Benzene hexachloride was also effective initially, but had less residual effect. In small-scale trials disodium ethylene bisdi-thiocarbamate hexahydrate showed much promise. In certain cases chlorinated camphene caused some spray damage. A dormant spray of mineral oil was also effective against pear psylla, and its use may make further spraying unnecessary until early July.—U.S.D.A. Bur. Ent. Pl. Quar.
161. HALLEMANS, A.
L'anthomome d'hiver du poirier, *Anthonomus cinctus*. (Pear bud weevil.)
Courr. hort., 1949, 11: 544-5, illus.
The bud weevil of pears (*Anthonomus cinctus*) and the damage it causes are described. The best method of control is the application of a DDT emulsion consisting of 250 to 300 g. of 25% DDT emulsion + a wetter in 100 l. of water. For the time of application Belgian

growers are advised to await instructions from the advisory service stations.

162. LE JEHAN.

Dégâts occasionnés par le bupreste du poirier (*Agrilus sinuatus*). (Losses caused by the pear buprest.)

Pomol. franç., 1949, 76: 18-20.

An account of outbreaks of *Agrilus sinuatus* in recent years on pear trees in France and Switzerland. Comtesse de Paris, Duchesse d'Angoulême, and Beurre Hardy are particularly susceptible.

163. DRIGGERS, B. F.

Control of plum curculio on peaches with benzene hexachloride, parathion, chlordan and lead arsenate.

J. econ. Ent., 1949, 42: 330-5, bibl. 9.

In field trials in New Jersey, benzene hexachloride (gamma isomer 0.09-0.24 lb. per 100 gal.) gave much better control of plum curculio than either chlordan or acid lead arsenate. Parathion also gave good results. Evidence was obtained that the spray deposits given by the organic insecticides are more repellent to adult curculios than those given by acid lead arsenate, with or without DDT.—New Jersey Agric. Exp. Stat.

164. SMIRNOVA, O. N.

How to control currant buprestid boring beetle and clearwing moth. [Russian.]

Sad i Ogorod (Orchard and garden), 1949, No. 9, pp. 24-5.

The damage caused by the currant "zlatka" (a buprestid metallic borer beetle), and the currant clearwing moth [*Conopia tipuliformis* L.] and the damage caused by the larvae boring the shoots, are described. Control measures recommended are (1) cutting out all affected shoots, (2) applying an arsenical spray early in June to kill the larvae of the beetle when feeding on the leaves, and (3) applying, about a week later, a DDT or hexachlordane dust to control adults of both insects; this should be repeated in 7-10 days.

165. ZIMMERMANN, J.

Untersuchungen über die Anfälligkeit der Rebe (Gattung *Vitis*) gegen den Rebstichler (*Byctiscus betulae* L.). (A study of the susceptibility of grape vines to the pest *Byctiscus betulae*.)

Züchter, 1949, 19: 297-301, bibl. 3.

All *Vitis* spp. and *V. vinifera* varieties tested were susceptible to damage by the pest, but plants with succulent leaves, for instance of the *V. rupestris* type, suffered only slight feeding injury and the petiole was not punctured. Breeding should aim at the production of succulent leaves which would stop the propagation of the pest on vines.—Staatl. Weinbauinst. Freiburg Br.

166. RÉGNIER, R., AND JOARY, P.

La lutte contre les vers blancs. (Control of cockchafer larvae.)

C.R. Acad. Agric. Fr., 1949, 35: 528-31.

TROUVELOT, B., ARCHARD, J., AND POUTIERS, R.

L'opération hanneton "d'Étrépany. (Operations against the cockchafer at Étrépany.)

Ibid., pp. 531-7.

CAIRASCHI, —, AND OTHERS.

Essais de lutte contre le hanneton commun *Melolontha* (*Melolontha* L.) dans la haute vallée de la Saône au printemps 1949. (Cockchafer control in the upper Saône valley in the spring of 1949.)

Ibid., pp. 537-41.

CAIRASCHI, E.-A.

Essai de lutte contre les hannetons par pulvérisations faites d'avions avec des solutions de D.D.T. dans la région de Sarrebourg (Moselle). (Trials for the control of cockchafers by spraying from aeroplanes with DDT solutions in the Sarrebourg (Moselle) region.)

Ibid., pp. 541-2.

A series of papers on measures taken for the control of cockchafers in various parts of France, particularly by applications from aeroplanes.

167. SOENEN, A.

Les vers blancs. (Cockchafer larvae.)

Fruit belge, 1949, 17: 145-9, 175-6, 181-5, illus.

After mentioning that the numbers of adult cockchafers may be slightly reduced by the help of school children and by voracious birds, the author describes experiments with HCH which gave promising results when injected at 5% into the soil of a young apple orchard.

168. FRIEND, A. H.

The control of the Queensland fruit fly (*Strumeta tryoni*).

Agric. Gaz. N.S.W., 1949, 60: 307-8, 334.

The results of tests on Narrabeen plums and China pears favour the sugar-bait technique, and the high-grade tartar emetic sugar bait gave the greatest amount of fruit free from stings. Trees treated with one of the newer insecticides, E605, yielded fruit which, though heavily stung, did not develop maggots.

169. DUMONT, L.

A propos du "Clinodiplosis" en pépinière. (Clinodiplosis in the nursery.)

Pomol. franç., 1949, 76: 42-3.

A note on the damage caused to budded nursery fruit and other plants by the bud borer *Clinodiplosis oculiperda*, a pest not well known in France.

170. SCHNEIDER, F.

Wicklerräupen auf importierten Äpfeln. (Caterpillars of leaf-roller moths on imported apples.)

Schweiz. Z. Obst- u. Weinb., 1949, 58: 423-5, bibl. 2.

Feeding injuries around the calyx and stalk on Gravenstein apples imported from the South Tyrol were shown to be due to the larvae of *Pandemis heparana*, *Capua reticulana* and *Cacoecia podana*. This suggests that in the South Tyrol the moths have two generations, the second preferring the skin of the fruit to the hardness of the autumnal leaf. Control of the pests should be studied in the two brood areas.

171. HOGAN, T. W., AND MORRIS, D. S.
Codling moth and light-brown apple moth.
Experiments in Goulburn Valley.
J. Dep. Agric. Vict., 1949, 47: 260-4, illus.
Codling moth infestation was low and there were no significant differences in the results. Against the light-brown apple moth (*Tortrix postvittana* Walk.) two sprays of a mixture of DDT and lead arsenate reduced the infestation from 11.8% to 0.5%. A third spray later in the season gave no improvement in control.
172. NEWTON, J. H., AND LIST, G. M.
Codling moth and mite control in 1948.
J. econ. Ent., 1949, 42: 346-8, bibl. 4.
Combination sprays were tested for simultaneous control of codling moth and the clover mite (*Bryobia praetiosa*) on apple trees. DDT proved to be the most effective material for control of codling moth; it was equally effective in combination with a dinitro compound, wettable sulphur, selenium and parathion. These 4 materials gave equal control of clover mite. Methane spray and alkyl sulphide failed to give satisfactory mite control and both caused foliage and fruit injury.—Colorado Agric. Exp. Stat., Fort Collins.
173. DRIGGERS, B. F., AND MERRILL, L. G., Jr.
Oriental fruit moth control with DDT and parathion.
J. econ. Ent., 1949, 42: 351-4.
In peach orchards in New Jersey, 2 third brood sprays of DDT were not materially less effective in reducing total injury by oriental fruit moth than 1 second brood and 2 third brood sprays of either DDT or parathion.—N.J. Agric. Exp. Stat., New Brunswick.
174. COCHRAN, J. H.
Comparative effectiveness of various organic insecticides against the oriental fruit moth.
J. econ. Ent., 1949, 42: 348-50.
DDT, the methoxy analogue of DDT, DDD and parathion were tested in the field against the oriental fruit moth and second brood curculio on peaches. Parathion was more effective against both these insects than any of the other materials. The methoxy analogue of DDT was the only other material that was effective against both; although it gave less good control of oriental fruit moth than DDT, it is reported to be less toxic to warm-blooded animals than either DDT or parathion, and further study is considered justified.—S. C. Exp. Stat., Clemson.
175. GRAHAM, C.
Control of the red-banded leaf roller [*Argyrotaenia velutinana*].
J. econ. Ent., 1949, 42: 354-6.
Parathion, at the rate of 4 oz. toxicant to 100 gal. spray, gave practically 100% control of first brood red-banded leaf roller when used in the petal fall and first cover spray. Lead arsenate, used in 4 sprays, gave control of fruit injury but was not sufficiently toxic to larvae on the foliage to prevent a build-up of the second and third brood populations. DDT and chlordane were unsatisfactory for control of first brood populations. DDD (1 pint of 25% emulsion to 100 gal. spray) gave excellent control of second brood.—Univ. Maryland Field Station, Hancock.
176. KING, H. L., AND HUTSON, R.
Further studies on control of red-banded leaf roller with parathion.
J. econ. Ent., 1949, 42: 398-9, bibl. 1.
In field trials at the Michigan State College, East Lansing, 5 cover sprays of parathion wettable powder, used at the rate of 10 oz. actual parathion per 100 gal. water, gave excellent control of red-banded leaf roller on apples, but not significantly better than 4 oz. parathion or 48 oz. lead arsenate. 16 oz. DDT gave inferior control. Chemical analyses indicated negligible residues of parathion 4 weeks after spraying. Spray injury was observed following the heavy dosage of parathion, and to a lesser extent following the lighter dose.
177. BOBB, M. L.
Sprays for control of the peach tree borer [*Sanninoidea exitiosa*].
J. econ. Ent., 1949, 42: 343-5, bibl. 3.
Applications of sprays containing DDT to the trunks and crotches of peach trees have proved effective in controlling the peach tree borer in Virginia. This insecticide kills larvae and adult moths. Results show that two applications, the first in early July and the second in mid-August, containing 4 lb. of actual DDT per 100 gal. of water, gave satisfactory control of the borer. This concentration had a residual effectiveness of 9 weeks in 1947 tests. Chlordane at 1 lb. per 100 gal. of water was not as effective as DDT and had a relatively short period of residual killing. Parathion was used at the rate of 1 lb. of 25% material per 100 gal. of water in 1948 and gave excellent control in an orchard with a light infestation and good control in a heavily infested orchard. DDT trunk sprays have marked advantages over paradichlorobenzene and ethylene dichloride emulsion treatments. [Author's summary.]—Virginia Agric. Exp. Stat., Charlottesville.
178. NICKELS, C. B.
DDT and other insecticides to control the pecan nut case-bearer.
J. econ. Ent., 1949, 42: 357-9.
Field experiments carried out in Texas in 1946 and 1947 indicated that DDT is an effective material for control of the pecan nut casebearer, *Acrobasis caryae*. Late summer applications of DDT, benzene hexachloride, and lead arsenate materially reduced the number of casebearer larvae that went into winter quarters. In laboratory tests benzene hexachloride and a mixture of hexaethyl tetraphosphate with DDT killed a large percentage of the nut casebearer eggs. [From author's summary.]—U.S.D.A. Bur. Ent. Pl. Quar.
179. SPENCER, H., BROWN, L., AND PHILLIPS, A. M.
Use of the parasite *Trichogramma minutum* for controlling pecan insects.
Circ. U.S. Dep. Agric. 818, 1949, pp. 17, bibl. 7, illus.
Some 60 million parasites of the species *Trichogramma minutum* Riley, were reared and released in Georgia and Florida pecan groves in attempts to control the pecan nut casebearer (*Acrobasis caryae* Grote), the pecan leaf casebearer (*Acrobasis juglandis* (Le B.)) and the hickory shuckworm (*Laspeyresia caryana* (Fitch)). The results obtained do not indicate that it would be a satisfactory control.

Snails.

180. COTTON, B. C.

These snails may invade your garden.

J. Dep. Agric. S. Aust., 1949, 52: 561-5, illus.

Five snails and 3 slugs are described and illustrated and there are also notes on the carnivorous slug and the carnivorous native snails.

Sprays and spraying.

(See also 46, 97, 98.)

181. READ, F. M.

Orchard pest control; overseas developments in spraying equipment.

J. Dep. Agric. Vict., 1949, 47: 355-66, illus.

Observations made by the author during a visit to England and North America in 1948. Nineteen illustrations show different types of spraying machines.

182. BRITISH COLUMBIA DEPARTMENT OF AGRICULTURE.

Control of tree-fruit pests and diseases.

Provincial and B.C. Dep. Agric. Spray Schedule, 1949, 1 Folding Sheet.

Twenty-six formulae for preparing sprays are enumerated with notes on the ingredients mentioned. Pests and diseases are listed to show which formula to use in any particular case.

183. BESEMER, A. F. H.

Nieuwe plantenziektenbestrijdingsmiddelen en hun toepassing. (New insecticides and fungicides and their application.) [English summary 10 ll.]

Meded. Dir. Tuinb., 1949, 12: 569-83.

After the war very many new or little known insecticides and fungicides were introduced into Holland. These have now been tested and the present report records the results obtained.

184. MAILLET, A.

Traitements anti-parasitaires aériens. (Aerial control of parasites.)

Progr. agric. vitic., 1949, 131: 336-8.

A note on helicopters for disease and pest control with particular reference to their evolution in England. Brief reference is made to their use in France against cockchafers.

185. DUMAS, P.

Les traitements de printemps des pommiers et poiriers en fonction de leur prix de revient. (The cost of spring treatments of apple and pear trees.)

Pomol. franç., 1949, 76: 74-80.

A discussion on the costs of winter and spring applications of fungicides and insecticides to apple and pear trees in France.

186. KUHN, L.

Welche Bedeutung hat die Umrührung der Spritzbrühe auf den Bekämpfungserfolg. (Agitation of the spray mixture and successful control.)

Anz. Schädlingssk., 1949, No. 6, p. 91.

An examination of commercial arsenic and carbolineum

preparations showed that particle size varies largely and that in no case was the suspension equal to the standard laid down. All the more importance attaches to the mechanism of agitation in a spraying machine, for which recommendations are made. O.J.

Fungicides.

(See also 85.)

187. SCHOENE, D. L., TATE, H. D., AND BRASFIELD, T. W.

Use of quinones as fungicides.

Agric. Chemls., 1949, 4: 24-7, 73-7, bibl. 58.

Dealing chiefly with Spergon and Phygon and their action as foliage sprays and seed protectants on the diseases of various fruit and vegetable crops.

Pest control.

(See also 471.)

188. LAWREY, V. L.

Orchard pest control. Departmental demonstration plot—West Tamar District.

Tasm. J. Agric., 1949, 20: 182-7.

Points from the report on results obtained on the demonstration plot are as follows:—DDT as a control for light brown apple moth [*Tortrix postvittana* Walker] is a failure, but trees sprayed with full programme DDT were almost entirely free from codling moth damage. The dormant red oil spray for control of red spider was quite adequate for the varieties in the plot during the season, even on trees which were heavily sprayed with DDT. Black spot [scab] control was adequately maintained by the greentip bordeaux spray followed by lime-sulphur in the pink stage and colloidal sulphur in the calyx and first cover sprays.

189. WASON, E. J., AND LLOYD, N. C.

Pests of pome fruit trees.

Agric. Gaz. N.S.W., 1949, 60: 479-81.

Recommendations for the control of codling moth, red mite, red spider, woolly aphid and light brown apple moth, based on the results of investigations carried out during the past few years.

190. FLETCHER, S. B. D.

Controlling strawberry pests. Can spraying methods provide an effective under-leaf kill?

Fruitgrower, 1949, 108: 756-7, illus.

Although fumigation gives a more effective control of strawberry aphid in the field than spraying, it is also more expensive. The author discusses the possibility of effecting an adequate kill by liquid spraying, and suggests some improvisations, well illustrated by diagrams, that could be made to the spraying equipment in order to give a satisfactory "down-on" or combined "down-on" and "up-under" spray.

191. DELANOUÉ, P.

L'orientation de la lutte chimique contre les insectes nuisibles à l'agriculture. (The chemical control of agricultural pests.)

Bull. Serv. bot. agron. Tunis. 10, 1948, pp. 14, bibl. 14.

An account of the properties and technique of application of new synthetic insecticides used in agriculture and horticulture.

192. FREZAL, P., AND PIGUET, P.
Les méthodes actuelles appliquées en Afrique pour lutter contre les principaux parasites de l'olivier. (Methods of control used in Africa to-day against the principal parasites of the olive.)
Oléiculture et Oléotechnie. Rapports et travaux du 12^e Congrès Internat. d'Oléiculture, 1949, pp. 107-17, from abstr. in *Oléagineux*, 1949, 4: 775.
- For the two most serious pests, the olive fly and the starling, the grower has no efficient and economic means of control. The new insecticides, however, appear to offer a solution to the problem of the fly.
193. MÄSSING, W.
Über eine neue Gruppe von Insektiziden (Vorläufige Mitteilung). (A new group of insecticides. Preliminary communication.)
NachrBl. biol. Zentralanst. Braunschweig, 1949, 1: 94-7, bibl. 23.
- The halogen derivatives of the homologues of benzene were prepared and tested systematically in order to combine the insecticidal action of the chlorinated radicle with the lipoid-dissolving methyl group. In this manner a new group of insecticides was discovered, which is as harmless to warm-blooded animals as hexachlorocyclohexane but has the following two advantages: It has a wider range of application, and does not affect the taste of the plants treated. Structural formulae of the new chemicals are presented and a fuller account of their action is promised.
194. DETROUX, L.
Sur les applications insecticides des esters phosphoriques et thiophosphoriques. (Insecticidal applications of phosphoric and thiophosphoric esters.)
Parasitica, 1949, 5: 68-82, bibl. 12.
- The properties, toxicity, and mode of action of phosphoric and thiophosphoric esters used in insecticides are discussed and their effect on various horticultural pests is described.
195. KUENEN, D. J.
Schadelijke nevenwerking van bestrijdingsmiddelen. (Harmful by-effects of insecticides.) [English summary $\frac{1}{2}$ p.]
Meded. Dir. Tuinb., 1949, 12: 607-15, bibl. 16.
- Disadvantages that may result from the application of chemical insecticides are a disturbance of biological equilibrium (useful insects may be killed), the development of resistance in strains of insects by repeated applications, and the stimulation to increased multiplication of some insects.
196. ECKERT, J. E.
Determining toxicity of agricultural chemicals to honey bees.
J. econ. Ent., 1949, 42: 261-5, illus.
- Comparative data on the toxic effects of various insecticides on bees, when applied under similar conditions in the laboratory, are tabulated. The insecticides tested were benzene hexachloride, chlordan, J.H.118 (an experimental compound related to chlordan), DDD, DDT, HETP, Parathion, TEPP, and toxaphene.—Univ. of California, Davis.
197. MITCHELL, W., AND TRESADERN, F. H.
The analysis of pyrethrum flowers.
J. Soc. chem. Ind. Lond., 1949, 68: 221-5, bibl. 12.
- As a result of experiments, data of which are presented, the use of cold ligroin is recommended both for the assay and for the commercial extraction of pyrethrum flowers. It is also suggested that the flowers should be standardized only on their content of pyrethrin I.
- Noted.
- 198.
- a BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE.
Articles published in 1948 [with table of contents and lists of authors].
[Publ.] *U.S. Dep. Agric., agric. Res. Administ., Bur. Ent. Pl. Quar.* E-767a, 1949, 369 references.
 - b CULLINAN, F. P.
Some new insecticides—their effect on plants and soils.
J. econ. Ent., 1949, 42: 387-91.
 - c CUTRIGHT, C. R., AND PARKS, T. H.
Combating the periodical cicada [*Magicicada septemdecim*] with insecticides.
J. econ. Ent., 1949, 42: 359-62.
 - d DONOHUE, H. C., AND OTHERS.
Biology of the raisin moth [*Ephestia figulilella* in California].
Tech. Bull. U.S. Dep. Agric. 994, 1949, pp. 23, bibl. 38.
 - e HAMMER, O. H.
The triethanolamine salt of dinitro-o-sec-butylphenol to control certain pests on fruit trees.
J. econ. Ent., 1949, 42: 380-3.
 - f JANKE, O.
Der Birnprachtkäfer (*Agrilus sinuatus* Oliv.). (The sinuate pear tree borer.)
Anz. Schädlingssk., 1949, 22: 4: 51, illus.
 - g KREITMAN, G., AND NORD, F. F.
Lycopersin, a pigment from *Fusarium lycopersici*.
Arch. Biochem., 1949, 21: 457-8, bibl. 6, being *Comm. Dep. organ. Chem. Fordham Univ.*, N.Y., 171.
 - h MARTIN, H.
Prove con trattamenti contro il *Dacus oleae* Rossi nella provincia di Tarragona dal 1946 al 1948. (Trials for the control of the olive fly in the province of Tarragon, 1946-48 [with various DDT preparations].)
Mitt. Schweiz. ent. Ges., 1948, Vol. 21, No. 3, and *Olearia*, 1949, 3: 298, from abstr. in *Oléagineux*, 1949, 4: 775.
 - i ROLAND, G.
Les viroses du fraisier. (Strawberry viruses.)
Fruit belge, 1949, 17: 177-81, bibl. 5, illus.
A review based mostly on work at East Malling, England.

j RYAN, F. E.

Fruit fly breeding for experimental purposes—
apparatus suitable for breeding *Ceratitis*
capitata.

J. Aust. Inst. agric. Sci., 1949, 15: 92-4.

k VAPPULA, N. A.

Finnish entomological literature published in
1947 including economic entomology and
control of insect pests.

Ann. ent. fenn., 1949, 15: 1a: 1-16.

WEEDS AND WEED CONTROL.

Particular weeds.

199. HOLMGREN, A. H., AND MAGUIRE, B.

Noxious weeds of Utah farm lands.

Circ. Utah agric. Exp. Stat. 123, 1949, pp. 48,
illus.

A description of the growth and habit of 34 weeds,
30 of which are already growing in Utah. Control
measures are not considered.

200. SARFATTI, G.

Ricerche sulla flora infestante delle culture
in Italia. 1. Introduzione bibliografica
e metodologica. (Study of the weeds of
farm land in Italy, a bibliographical intro-
duction.) [English summary 30 ll.]

Nuov. G. bot. it., 1948, 55: 527-58, bibl. 164.

The author surveys foreign and the somewhat scanty
Italian literature on weeds. He divides weeds into
two categories, namely those present in any place from
time immemorial, and those introduced by man's
various activities, which have the greatest possible
influence on the occurrence and distribution of weeds.
He stresses the importance of the biological study of
weeds and describes the classification used by Korsmo,
who divides weeds into 3 main groups, viz. seed,
stationary, and wandering.

201. STODDARD, L. A., HOLMGREN, A. H., AND
COOK, C. W.

Important poisonous plants of Utah.

Spec. Rep. Utah agric. Exp. Stat. 2, 1949,
pp. 21, bibl. 2, illus.

Twenty-two plants poisonous to stock are described
and 12 are very beautifully illustrated in colour.

202. ANDERSON, E. G.

Poison ivy.

Publ. Dep. Agric. Canada Sci. Serv. 820
(*Circ.* 180), 1949, pp. 8, illus.

Information on how to identify and control this weed.
Repeated mechanical cultivations or sprays containing
2,4-D, ammate or sodium chlorate are recommended.

203. OFFORD, H. R.

Effective control of *Ribes* with 2,4-D and
2,4,5-T.

Agric. Chemls., 1949, 4: 31-5, 71-7, bibl. 13.

Results from greenhouse and field work completed
during 1944-48 are summarized to show the importance
of season, formulation, dosage, and method of applica-
tion of 2,4-D and 2,4,5-T in relation to the effective
use of these herbicides for ribes eradication. The two
methods of treatment now in general use are spraying
intact plants with dilute aqueous solution (250 to
1,000 p.p.m. for 2,4-D and 2,000 p.p.m. for 2,4,5-T)
acid equivalent, and decapitating individual plants and
applying ester or amine concentrates (1% to 20%) in
oil or water to the freshly cut surface of the root crown.
Of the 29 *Ribes* species on which 2,4-D tests were made,

only *R. americanum*, *bracteosum*, *cereum*, *nevadense*,
petiolare, *roszli*, and *speciosum* can be effectively and
economically killed by dilute 2,4-D sprays applied to
aerial plant parts. Several species that cannot be
readily killed by 2,4-D can be killed by 2,4,5-T sprays.
Susceptible ribes are not killed by dilute sprays unless
all stems and leaves are thoroughly covered. Even on
susceptible species spraying can only be effective when
the plants are actively growing. For mature bushes
of most *Ribes* species this period corresponds to the
interval between the time the leaves are fully expanded
until the fruits are about two-thirds grown. In the
selective spraying of ribes in California, a brilliant
white titanium pigment is used as a marker at the rate
of 1 to 1½ lb. per 100 gal. of 2,4-D spray solution.
[From author's summary.]—U.S. Dep. Agric., Bureau
of Entomology and Plant Quarantine.

Herbicides and their action.

204. JOHNSTON, R. E.

The use of selective weedkillers in horticul-
tural crops.

Scot. Agric., 1949, 29: 108-11, bibl. 2.

After a preliminary warning that the improvement of
soil tilth due to hoeing is indispensable to good hus-
bandry, the author discusses usefully the application
of sulphuric acid, tractor vaporizing oil and hormone
weedkillers.

205. CURRIER, H. B.

Responses of plant cells to herbicides.

Plant Physiol., 1949, 24: 601-9, bibl. 9, illus.

The visible effects of 4 herbicides (2,4-dichlorophenoxy-
acetic acid, 4,6-dinitro-2-sec. butyl phenol, pentachloro-
phenol, and O-isopropyl N-phenyl carbamate) on
several types of plant cell were studied over a wide
range of concentrations. The approximate concentra-
tions at which stimulation, retardation (reversible
injury) and the "premortal" stage (irreversible injury)
occurred are determined, and the effects on proto-
plasmic behaviour, such as streaming, permeability,
granulation, vacuolar contraction, vacuolation and
plasmolysis, in each of these stages is studied. It is
evident that most of these responses are hydration
phenomena involving an increase or decrease in the
water content of the cytoplasm. The different herbi-
cides did not display individual reactions to any extent,
indeed most of the effects described are not peculiar to
herbicides but have been observed as a result of other
means of stimulation and injury.—University of
California, Davis.

206. CRAFTS, A. S.

Toxicity of 2,4-D in California soils.

Hilgardia, 1949, 19: 141-58, bibl. 17.

A series of pot culture experiments, each involving
8 different soils and 10 concentrations of 2,4-D, were

carried out, using oats, sunflowers and Alaska field peas, to determine toxicity of the herbicide. Percolation tests were made for 5 soils and leaching tests in 3. Results indicate that under California conditions residual toxicity of 2,4-D following spray application is sufficient to cause injury to subsequent crops, but that as decomposition proceeds, after a lapse of time, a point is reached when growth is stimulated. The oats were markedly less affected by toxicity than the other plants. Spraying 2,4-D on foliage gives better and safer weed control than application direct to the soil in areas of low rainfall. As a permanent soil sterilant it is generally less effective than other chemicals.

G.K.A.

207. CRAFTS, A. S.

Toxicity of ammonium dinitro-*o*-sec-butyl phenolate in California soils.

Hilgardia, 1949, 19: 161-9, bibl. 5.

Using oat seedlings in a pot technique similar to that described in the preceding paper (Abstr. 206), it was found that, while the chemical was more toxic and decomposed more slowly than dinitro-*o*-cresol used in earlier trials, it could never accumulate in soils in amounts dangerous to crops as a result of normal selective or general contact spraying. However, the greater toxicity and slower rate of breakdown make water-soluble compounds of dinitro-*o*-sec-butyl phenol unsafe for use as pre-emergence sprays on tender crops. Like many other herbicides, the dinitro selectives on decomposition cause considerable stimulation of crop growth.

G.K.A.

208. McCALL, G. L.

Effect on crop plants of residual 2,4-D in the soil.

Proc. 3rd annu. Mtg North Central Weed Control Conf., Iowa, 1946, pp. 97-100 [received 1949].

This summarized report is based on data received from 6 experimental stations in the North Central region. Different types of 2,4-D were applied at 1,000 p.p.m. and/or 2,000 p.p.m. at 1½ gal. per sq. rod on bare soil, and the various crops planted or sown on the treated area immediately before and at specified intervals following treatment. The crops included garden peas and beans, tomatoes and spinach. It is concluded that most vegetable crops may safely be planted in soil treated with 2,4-D at rates practical for weed control 8-10 weeks after application.

209. DANIELSON, L. L.

A progress report of soil treatments with 2,4-D.

Proc. Southern Weed Conf., 1949, La St. Univ. Baton Rouge, pp. 18-21.

A series of field trials was designed to indicate how various soil moisture levels affect 2,4-D soil treatments for weed control, and to determine whether low volume applications are feasible. Two interesting results emerged: (1) application of 2,4-D to relatively dry soil, followed by excessive rainfall, resulted in failure of any of the materials to control weeds, and (2) low volume applications (5 gal. of water per acre) were as effective as high volume applications (100 gal. per acre) for applying equivalent amounts of the triethanolamine salt and the butyl ester of 2,4-D as a soil

treatment. More extensive trials are needed.—Virginia Truck Experiment Station, Norfolk.

210. ENNIS, W. B., Jr.

Plant responses to O-isopropyl N-phenyl carbamate.

Proc. 4th annu. Mtg North Central Weed Control Conf. Kansas, 1947, pp. 54-8 [received 1949].

Germination tests in soil treated with O-isopropyl N-phenyl carbamate showed that this chemical is not specific as a weedkiller for grasses. Of the 39 broadleaf species tested, 15 showed some reaction to the substance, and 9, including morning-glory, tobacco, tomato, petunia, pepper, cucumber and watermelon, were permanently inhibited. Typical responses of some crop plants when exposed to the carbamate by various methods are noted, and possible uses for compounds of this general type are discussed.

211. LOUSTALOT, A. J., and FERRER, R.

The effect of temperature on the persistence of sodium pentachlorophenate in the soil.

Proc. Southern Weed Conf. 1949, La St. Univ. Baton Rouge, pp. 55-8.

As sodium pentachlorophenate appears to be a promising herbicide for pre-emergence treatment of many large-seeded crops, including beans, peas and cucurbits, experiments were initiated at the Federal Experiment Station, Puerto Rico, to study the effects of various environmental factors on the persistence of this chemical in the soil. This paper deals with the effect of temperature. It is shown that prolonged toxic effects may be expected during cold weather, and that higher rates of application may be made with greater safety in warm weather than in cool.

212. KONING, H.

Kalkstikstof als onkruidbestrijdingsmiddel. (Weed control by calcium cyanamide.)

[English summary 3 pp.]

Meded. LandbVoorlichtDienst. 56, 1948, pp. 60, bibl. 140, illus., fl. 1.50.

Directions to growers on the use of calcium cyanamide as a weedkiller. Much of the information concerns weed control in cereals and grassland, but potatoes, peas, beet, asparagus, gladioli, bulbs and onions are also dealt with.

213. FREEMAN, J. F.

Killing weed seeds in planted soils with methyl bromide, 1948.

Proc. Southern Weed Conf. 1949, La St. Univ. Baton Rouge, p. 105.

Good results were obtained in tobacco seedbeds with both spring and autumn treatments. Details of application are given.—Ky Agric. Exp. Stat.

Weed control in vegetables.

214. VIEHMEYER, G.

Chemical weed control in horticultural crops. Regional summary.

Proc. 4th annu. Mtg North Central Weed Control Conf. Kansas, 1947, pp. 222-33 [received 1949].

This section of the *Proceedings of the North Central Weed Control Conference*, assembled by Glenn Viehmeyer, contains a paper by B. Wolf in which the

advantages and limitations of Stoddard's Solvents, 2,4-D, H.B. Aromatics and diesel compounds as pre-emergence sprays on beets and spinach are noted, a report by R. E. Nylund of experiments to determine the value of several phenolic compounds as selective weedkillers in onions, and 22 abstracts by various authors reporting experiments in chemical weed control in vegetable crops, potatoes, asparagus, strawberries and sweet corn.

215. HARRISON, T. B.

Effect on crop plants of residual 2,4-D in the soil.

Abstract in *Proc. 4th annu. Mtg North Central Weed Control Conf. Kansas*, 1947, p. 246 [received 1949].

Strips of sandy soil were treated with 2,4-D (Herbato-Ammonium salt 77·6% acid equivalent) at 1 or 2 lb. per acre, immediately after being sown with beet, carrots, snap beans, sweet corn and tomato, and planted with onion sets. The stand of beet and carrots and the yield of onions and snap beans was reduced by 2,4-D treatment; sweet corn and tomatoes, however, were unaffected. There was no ill effect observed in sowings made on the same strips 2 weeks later.—Dominion Exp. Stat., Harrow, Ontario.

216. FARISH, L. R., AND LEONARD, O. A.

Chemical weed control on annual cultivated field and horticultural crops at Stoneville.

Proc. Southern Weed Conf. 1948, Delta Br Exp. Stat., Stoneville, Miss., pp. 39-40.

A comparison of 17 treatments with chemical herbicides applied immediately after sowing. The test crops included sweet corn, lima beans, snap beans, garden peas, cucurbits and small-seeded vegetables. Sinox W, Sinox General, Dow Selective and Dow General did not injure any of the large-seeded crops, but did injure the small-seeded ones. They gave satisfactory control of broad-leaved weeds but not of grasses. Sodium pentachlorophenate was only effective in controlling grass and weeds at the high rate of 40 lb. per acre, at which rate it injured practically all crops. Trichloroacetate injured all bean crops, but not cucurbits or small-seeded vegetables. It was relatively effective in controlling grasses, but did not control broad-leaved weeds. Both the sodium and amine forms of 2,4-D were more effective in controlling annual grasses and weeds than the other materials used, but they also injured all the crops tested.

217. HERNANDEZ, T. P., AND WARREN, G. F.

Effects of pre-emergence treatments of 2,4-D on certain vegetable crops in 1948.

Proc. Southern Weed Conf. 1949, La St. Univ. Baton Rouge, p. 37.

The sodium salt of 2,4-D containing 80·5% acid was used throughout. Good control of pigweed in Chippewa Irish potatoes on peat soil resulted from pre-emergence treatments of 2 and 4 lb. 2,4-D per acre, and post-emergence treatments of $\frac{1}{2}$ and 1 lb. 2,4-D per acre when the plants were 6 in. high. There was no reduction in yield. 2,4-D at 4 lb. per acre and calcium cyanamide at 375 lb. per acre both gave good control of shepherd's purse, lambs' quarters and pigweeds in spring applications to crops of Mary Washington asparagus. Pre-emergence treatments of 1, 2 and 4 lb.

2,4-D per acre to Golden Cross Bantam sweet corn gave an 83-89% reduction of broad-leaved weeds and a 75-86% reduction of witchgrass and foxtail. Post-emergence treatments gave less control of broad-leaved weeds and little or no control of witchgrass and foxtail. Treatments applied when the corn was 18 in. tall gave some brace root injury.—La Agric. Exp. Stat.

218. ALBERT, W. B.

Progress report on chemical weed control experiments at Clemson, S.C.

Proc. Southern Weed Conf. 1949, La St. Univ. Baton Rouge, pp. 98-101.

Pre-emergence applications of 2,4-D and other herbicides. 2,4-D was used at the rates of 1·0 and 2·5 lb. per acre in pre-emergence applications in weed control experiments designed to determine the differences in varietal sensitivity of sweet corn and lima beans. The 2·5 lb. per acre applications resulted in moderate stunting of growth of the Oto and Seneca Chief varieties of sweet corn, but the Golden Grain and Aristo Gold Bantam Evergreen varieties were unaffected. All varieties were tolerant of applications at 1·0 lb. per acre. This lower rate was also tolerated by all the lima bean varieties tested except U.S.245. Peerless was severely damaged by the 2·5 lb. per acre rate of application. Weed control was in all cases better at the higher rate. On treated plots the growth of grasses was retarded, and within 3-4 weeks the dominant weed became Indian chickweed. *Effect of herbicides on annual and perennial grasses.* The most promising herbicide of those tried for control of grasses was the sodium or ammonium salt of trichloroacetic acid.—S. C. Exp. Stat.

219. HERNANDEZ, T. P., AND WARREN, G. F.

Weed control in asparagus.

Abstract in *Proc. 4th annu. Mtg North Central Weed Control Conf. Kansas*, 1947, p. 246 [received 1949].

An experiment was conducted in 1947 in an 8-year-old asparagus bed on silt loam soil to compare the sodium salt of 2,4-D acid equivalent with Granular Cyanamid as a herbicide. The treatments consisted of 4 lb. of 2,4-D per acre applied as a surface application early in the spring before any spears were showing and 375 lb. of Cyanamid per acre concentrated in an 18-inch band over the row when the weeds were about 2 to 3 inches tall. Ammonium nitrate was added to the 2,4-D plots and the checks to give the same amount of nitrogen as supplied by the Cyanamid. Neither of the treatments affected the yield or appearance of the asparagus spears as compared with the checks. Both treatments gave approximately a 90% reduction in the number of weeds, which consisted mostly of mouse-ear chickweed (*Cerastium* spp.) and shepherd's purse (*Capsella bursa pastoris*). (Contributed by University of Wisconsin, Madison.) [Authors' abstract.]

220. HOFFMAN, J. C.

Weeding celery seedbeds with solvent naphthas.

Press Bull. Fla agric. Exp. Stat. 651, 1948, pp. 4.

As a result of tests chemical weeding of celery seedbeds is recommended as profitable, if more than 50 man-hours are needed for the hand-weeding of an acre. Thirty-five gallons of solvent naphtha [desirable

physical characteristics stated] should be applied as a pre-emergence treatment or when the seedlings have developed to the stage of 2-6 leaves, and the weeds are very small. Until further information is available spraying should be carried out in the afternoon, preferably with a fine nozzle that will deliver a flat, fan-shaped spray. Applications at a more mature stage of the crop may cause injury.

221. BRADLEY, R. H., AND ELLIS, N. K.

The effect of different formulations of 2,4-D and other weed inhibitors applied on onions.
Proc. 4th annu. Mtg North Central Weed Control Conf. Kansas, 1947, pp. 169-70 [received 1949].

Pre- and post-emergence applications of 2,4-D, cyanamid, sodium cyanamid and sulphuric acid were made to plots of Early Yellow Globe onions in weed control trials. The results indicated that 2,4-D applied immediately after planting was not effective as a weed control measure, and that applications just prior to emergence caused extensive damage to the onions. Cyanamid [aero defoliant] in sufficient quantity to kill young weeds was effective, but smaller amounts tended to act as a stimulant to weed growth. Sodium cyanamid showed promise as a pre-emergence treatment, but caused serious injury to onions in the loop stage. Sulphuric acid gave satisfactory weed control in all stages.—Purdue University.

222. WARREN, G. F.

Weed control in onions with 2,4-D soil treatment.
Proc. 4th annu. Mtg North Central Weed Control Conf. Kansas, 1947, p. 247 [received 1949].

Pre-emergence sprays of the sodium salt of 2,4-D applied on peat soil just before the onions broke through gave from 50% to 90% reduction in the number of weeds present at the time of first weeding. The reduction at second weeding was much less, varying from 0% to 30%. Four pounds acid equivalent per acre gave only slightly better control than two pounds. There was no reduction in either the stand or yield of onions due to these pre-emergence sprays except in experiments on poorly drained peat. Pre-emergence sprays of the isopropyl ester of 2,4-D reduced the stand and yield of onions by 40%. When 2,4-D was applied to the soil and worked in before planting, weed control was not so good as with pre-emergence sprays and the stand and yield of onions were greatly reduced.—University of Wisconsin, Madison.

223. HERNANDEZ, T. P., AND WARREN, G. F.
Comparison of the effects of 2,4-D pre-emergence treatments on onions from seed and sets on peat and silt loam soils.
Proc. Southern Weed Conf. 1949, La St. Univ. Baton Rouge, p. 38.

A sodium salt of 2,4-D containing 80.5% acid was used at 2 and 4 lb. per acre. Treatments on the silt loam soil killed practically all of the onions from seed and greatly reduced the yield of onions grown from sets, whereas on the peat soil no significant reduction in yield resulted to either crop. The injury to onions was generally greater when the pre-emergence treatments were applied 1 day after planting than when

applied 6 days after planting.—Univ. Wisconsin, Madison.

224. HERNANDEZ, T. P., AND WARREN, G. F.

Weed control in potatoes with 2,4-D.
Abstract in *Proc. 4th annu. Mtg North Central Weed Control Conf. Kans., 1947, p. 246* [received 1949].

A replicated experiment was conducted with Chippewa potatoes on peat soil using the sodium salt of 2,4-D. It was applied to the soil at the rates of 2 and 4 lb. per acre of the 2,4-D acid equivalent, each as a pre-planting treatment worked into the soil 3 in. deep, as a surface application immediately after planting, and as a pre-emergence spray just before the potatoes came up. In addition, one treatment was applied as a direct spray of 1,000 p.p.m. at 100 gal. per acre when the potatoes were approximately 8 in. high. The direct spray severely stunted the potatoes for a period of approximately 2 weeks, but later they appeared normal. None of the treatments gave a significant reduction in yield compared with the check, and there was no apparent effect on tuber quality. The direct spray gave nearly 100% control of the weeds present which were mostly pigweed (*Amaranthus retroflexus*). As compared with the checks, the 2 lb. soil applications reduced the number of weeds by 38 to 60% and the 4 lb. applications by 64 to 74%. The weeds not killed were severely stunted. Weed control was slightly better where the 2,4-D was applied to the soil surface than where it was worked in before planting. (Contributed by University of Wisconsin, Madison.) [Authors' abstract.]

225. NIXON, P. P., AND SMITH, G. E.

Pre-emergence weed control for tomato plants in cold frames.

Proc. Amer. Soc. hort. Sci., 1949, 53: 347-8.

Weeds were killed and tomato plants, which emerged 1-2 days after application, were unaffected by Stoddard's Solvent.

Weed control in strawberries.

226. VIEHMEYER, G.

Varietal differences in tolerance to 2,4-D in strawberries.

Abstract in *Proc. 4th annu. Mtg North Central Weed Control Conf. Kans., 1947, p. 237* [received 1949].

A 1,000 p.p.m. solution of the sodium salt of 2,4-D was applied to 40 clones of hybrid strawberries, including 3 hybrid progenies and 3 commercial varieties (Dunlap, Midland, and Premier). A study of the effects indicates that differences in tolerance, wide enough to be economically important, exist between strawberry varieties, and that some varieties possess enough tolerance to 2,4-D to make weed control without serious injury to the crop a possibility.—University of Nebraska Substation, North Platte.

227. DANIELSON, L. L.

Weed control in vegetable crops [and strawberries].

Proc. Southern Weed Conf. 1948, Delta Br. Exp. Stat., Stoneville, Miss., pp. 30-2.

A brief report of some of the work done at Norfolk, Virginia. *Strawberries.* Preliminary experiments

begun in 1945 showed that the Blakemore variety of strawberry is quite resistant to injury by 2,4-D except when the chemical is applied during flowering or fruiting. In a field experiment made in 1947, 2,4-D was applied at the rate of 2 lb. of the 70% sodium salt in 100 gal. water per acre in July, and gave very efficient control of summer weeds, including crab grass and bull grass. A similar treatment in November effectively controlled the winter weeds, chickweed and henbit. Sinox and Sinox General also gave excellent control of winter weeds. *Corn*. Pre-emergence applications of 2,4-D to sweet and field corn gave good control of weeds for the first 3-4 weeks after germination, and no lodging or brittle stalk conditions were observed. *Parsley*. Shell Weedkiller 110 and Ezzo Varsol were used for weed control in parsley before emergence and at various stages of crop growth up to the 6-leaf stage. The lowest successful rate of application was 75 gal. per acre. Injury to the crop only occurred when the oil was applied to the wet foliage in early morning. Crabgrass and broad-leaved weeds with the exception of ragweed and Galenso, were effectively controlled.

228. WILSON, W. F., RYKER, T. C., AND STAMPER, E. R.

2,4-D and weeds in strawberries.

Proc. Southern Weed Conf. 1949, La St.

Univ. Baton Rouge, p. 108.

Applications of 0.8 lb. or more of sodium 2,4-D per acre to the middle of the rows after scraping and strawing gave excellent control of weeds during the harvesting period without any observable effects on the crop. Pre-planting applications 0.8-3.0 lb. of 2,4-D per acre in October reduced but did not control weeds. Spraying in January with 0.8 lb. sodium 2,4-D per acre caused considerable injury to the strawberry plants but did not kill them. Most broad-leaved weeds were controlled. Pre-planting applications of 2 lb. per acre of the amine salt of 2,4-D were tested on a large scale on 5 farms. Temporary plant injury occurred on 1 farm. The reduction of weeds varied from 23% to 71%.—*La agric. Exp. Stat.*

Weed control in ornamentals.

229. FRIESEN, H. A.

Effect of foliage sprays of 2,4-D on woody plants when applied to nearby herbaceous plants.

Proc. 4th annu. Mtg North Central Weed Control Conf. Kansas, 1947, p. 259 [received 1949].

Weeds growing under honeysuckle, lilac and carrigana were successfully controlled by applications of the sodium salt and ester types of 2,4-D sprayed at the rate of 8 and 16 oz. per acre, with no serious injury to the shrubs.—*Dom. Exp. Stat, Scott, Sask.*

230. JENKINS, J. M., Jr.

The use of 2,4-D as a pre-emergence spray for the control of weeds in gladioli, daffodils, and Dutch iris.

Proc. Southern Weed Conf. 1949, La St. Univ. Baton Rouge, pp. 92-5, and Proc. Amer. Soc. hort. Sci., 1949, 53: 513-16, bibl. 2.

Several tests made at the North Carolina Agricultural Experiment Station indicated that weeds can be successfully controlled in plantings of gladioli, Dutch irises and daffodils by pre-emergence sprays of 2,4-D. No injury was observed on gladioli when 8 lb. 2,4-D per acre were used, but it is considered that 2 to 4 lb. should give adequate commercial control.—*Wilmington, N.C.*

231. DeFRANCE, J. A.

Crabgrass (*Digitaria* spp.) control in turf with chemicals.

Proc. Amer. Soc. hort. Sci., 1949, 53: 546-54.

Detailed instructions are given for the application of several substances which give good control.

Weed control in tropical crops.

232. LOUSTALOT, A. J.

Progress report on weed control. Experiments to control nutgrass.

Proc. Southern Weed Conf. 1948, Delta Br. Exp. Stat., Stoneville, Miss., pp. 7-8.

1. *Comparison of ethylene dibromide and chloropicrin as soil fumigants.* The fumigants were applied in furrows 6 in. deep and 6 in. apart, which were then covered in and the fumigant sealed by watering the soil. Ethylene dibromide, applied at the rate of 6 ml. and 12 ml. per sq. ft., gave excellent control of nutgrass, but at 3 ml. per sq. ft. this was ineffective. It is not practicable for use on a large scale, however, owing to the high cost of the fumigant and the labour involved in application. Chloropicrin not only failed to control nutgrass but seemed to stimulate growth.

2. *Experiments with sodium trichloroacetate and 2,4,5-trichlorophenoxyacetic acid.* Sodium trichloroacetate, applied at the rate of 218 lb. per acre, greatly reduced the stand and vigour of nutgrass but was slow in action. 2,4,5-trichlorophenoxyacetic acid gave no control.

3. *2,4-D-tillage and smother crop combination to eradicate nutgrass.* No control was obtained.—*Mayaguez, Puerto Rico.*

233. LOUSTALOT, A. J., AND FERRER, R.

Progress report on weed control. Harvest results in a chemical weed control experiment in sugarcane.

Proc. Southern Weed Conf. 1948, Delta Br. Exp. Stat., Stoneville, Miss., p. 10.

Nine herbicidal treatments were compared with hand hoeing for control of weeds in sugar-cane in Puerto Rico. The yield of sugar-cane from each plot and the total cost of each treatment are tabulated. There was no significant difference in yield among the various treatments. The two cheapest treatments were Penite 6 and 2,4-D, but these are not recommended, as Penite 6 is an arsenical and 2,4-D only controls broad-leaved weeds. Dow contact herbicide and an oil emulsion fortified with butyl phenol gave the most satisfactory weed control but they were also the most expensive.

234. CRAFTS, A. S., AND EMANUELLI, A.

Erradicacion de yerbajos en la caña de azucar. (Eradication of weeds in sugar cane.)

Bol. Est. Exp. Agric. Puerto Rico 83, 1948, pp. 27, bibl. 6, illus.

This bulletin deals mainly with weed control by means of the general contact herbicide known as 30-2-2, developed at the Agricultural Experiment Station, Rio Piedras, Puerto Rico. It consists of 30 lb. highly aromatic oil, 2 lb. pentachlorophenol and 2 lb. stabilizer (Oronite) emulsified in water, the strength of the final emulsion depending on the maturity of the weeds. The ingredients, preparation and application are discussed in detail. Being non-selective in action, it is toxic to grasses as well as to broad-leaved weeds, but the time of application must be carefully chosen to prevent damage to the cane plants. The periodic addition of 2,4-D to this emulsion is recommended to give better control of highly resistant weeds such as *Ipomoea* and "cohitre". Pre-germination treatment by 2,4-D is also dealt with.

235. BROWN, C. A.

Review of weed control studies in Louisiana.

Proc. Southern Weed Conf. 1948, Delta Br. Exp. Stat., Stoneville, Miss., pp. 28-9.

Includes brief notes on the control of alligator weed by 2,4-D, and Johnson grass by fallow cultivation and chemicals, both in sugar-cane plantations.

236. CARTER, E. P.

Experiments with ammonium and sodium trichloroacetates for the control of Johnson grass and Bermuda grass in Georgia.

Proc. Southern Weed Conf. 1949, La St. Univ. Baton Rouge, pp. 26-9.

Control of Johnson grass with ammonium trichloroacetate. Ammonium trichloroacetate was tested for control of Johnson grass (*Sorghum halepense*) at various concentrations and at various stages of grass growth. Concentrations of $\frac{1}{2}$ and 1% acid equivalent were inadequate, but 2% solutions at 72.5 lb. per acre prevented sprouting in stubble plots and killed the above-ground parts on plots where the grass was 6 in. and 3 ft. high. Unmown mature plants, 7 ft. high, were injured but not killed. Application of a 4% solution at 145 lb. per acre resulted in apparent kill of all plants in all plots within 9 days. Applications of 1 lb. ammonium sulphamate per 100 sq. ft. at 425.6 lb. per acre also killed all plants within 9 days. *Control of Bermuda grass in peach orchards with sodium trichloroacetate.* Sodium trichloroacetate applied in aqueous solution at 40 and 80 lb. acid equivalent per acre gave complete kill of all the above-ground parts of Bermuda grass, with no injury to the peach trees; 61 days after treatment no regrowth was observed.—U.S.D.A. and Georgia Exp. Stat.

237. GODCHAUX II, L.

The use of chlorate for Johnson grass control [in sugar-cane].

Proc. Southern Weed Conf. 1949, La St. Univ. Baton Rouge, pp. 48-52.

Sodium chlorate has been used very successfully in recent years for the elimination of Johnson grass on ditch banks and headlands of sugar-cane fields, and tests carried out in 1948 indicated that it could also be used as a selective herbicide in growing cane when applied to first-year stubble. Details of application and costs for both treatments are discussed.—Godchaux Sugars Inc., New Orleans, La.

238. PHILLIPS, R. P., AND CHILTON, S. J. P.

Seed populations of Johnson grass in Louisiana cane areas.

Proc. Southern Weed Conf. 1949, La St. Univ. Baton Rouge, pp. 59-60.

The viability of Johnson grass seed was studied at the Louisiana State University. Germination counts indicated that the seed has an initial dormancy period averaging 12 weeks. Cultural practices were found to influence seed populations in the soil, as fields in corn and beans had a higher population than infested stubble cane, while fallow ploughed land had a much lower population than either.

239. STAMPER, E. R., AND CHILTON, S. J. P.

2,4-D, flaming and Johnson grass seedlings.

Proc. Southern Weed Conf. 1949, La St. Univ. Baton Rouge, pp. 70-2.

The use of 2,4-D as a pre-emergence and post-emergence spray followed by flaming as a means of controlling Johnson grass seedlings in sugar-cane fields was tested at the Louisiana Agricultural Experiment Station, Baton Rouge, in 1948. Good results were obtained in both cases. The data are tabulated.

240. ARCENEUX, G., AND HEBERT, L. P.

Recent developments in the control of weeds on sugarcane lands in Louisiana.

Proc. Southern Weed Conf. 1949, La St. Coll. Baton Rouge, pp. 102-4.

In sugar-cane plantations heavily infested with alligator weed, 2,4-D (sodium salt applied at the rate of 1 lb. acid equivalent per acre, 3 times annually, in addition to mechanical cultivation) gave excellent control of this weed compared with flaming, hoeing and mechanical cultivation treatments. Very effective control of the tie-vine weeds was obtained with the triethanolamine salt of 2,4-D sprayed by airplane. 1 lb. acid equivalent in 3 quarts of water gave good control of *Ipomoea coccinea* and *I. quamoclit*, but *Jaquemontia tamnifolia* required a slightly heavier dose. Soybeans sown in March and early April were an effective smother crop against alligator weed and red root (*Setaria* sp.). Recommendations are made for weed control on headlands and ditch banks.—Div. Sugar Plant Invest., Bur. Pl. Ind. U.S.D.A.

Noted.

241.

a COWART, C. E., AND RYKER, T. C.

Studies on chemical control of *Cyperus rotundus*.

Proc. Southern Weed Conf. 1949, La St. Univ. Baton Rouge, pp. 61-2.

b GREENWOOD, W.

Notes on some Fijian weeds and introduced plants.

J. Arnold Arbor., 1949, 30: 75-84.

c HAGOOD, E. S., AND STAMPER, E. R.

Comparative studies on effect of chemicals on control of seedlings of Johnson grass and other grasses.

Proc. Southern Weed Conf. 1949, La St. Univ. Baton Rouge, pp. 85-6.

- d HANSON, N. S.
Effect of 2,4-D spray [drift] on black walnut trees.
Abstract in *Proc. 4th annu. Mtg North Central Weed Control Conf. Kansas*, 1947, p. 260 [received 1949].
- e HERNANDEZ, T. P., AND WARREN, G. F.
Factors affecting the rate of inactivation of 2,4-D in peat soil and the rate 2,4-D is leached in different soils.
Proc. Southern Weed Conf. 1949, La St. Univ. Baton Rouge, p. 39.
- f RYKER, T. C., AND CHILTON, S. J. P.
Salts of trichloroacetic acid for the control of Johnson grass.
Proc. Southern Weed Conf. 1949, La St. Univ. Baton Rouge, pp. 82-4.
- g TULLIS, E. C., AND ORVE, K. H.
Airplane spray drift tests [with 2,4-D] in 1948 at Beaumont, Texas.
Proc. Southern Weed Conf. 1949, La St. Univ. Baton Rouge, p. 54.
- h VALLANCE, K. B.
Effect of the *Striga* germination stimulant on the respiration of *Striga* seeds.
Nature, 1949, 164: 802, bibl. 1.

VEGETABLE AND MISCELLANEOUS TEMPERATE CROPS.

General.

242. NAVLET, A.
Overcoats on seed reduce thinning expense.
Seed World, 1949, 65: 8: 10, 12, illus.
The many advantages claimed from the use of seed coating with "Montmorillonite" are discussed. This substance is a volcanic ash selected for its ability to adhere to the seed without a binder, and its property of becoming hard and strong upon drying and of softening rapidly when in contact with soil moisture. It is used under a patented process to increase the size of row-crop flower and vegetable seed to facilitate precision sowing and spacing.
243. KOPETZ, L. M.
Neue Gedanken zum Fruchtfolgeproblem.
(New ideas on the rotation problem.)
Jb. Hochsch. Bodenk. Wien, Vol. 2 (1948), 1949, pp. 59-64.
The interaction between crops and the microflora and structure of the soil is discussed. Data from the author's own experiments illustrate the beneficial effect a preceding deep-rooting crop may have on another deep-rooting crop which follows it in the rotation. On 20 July, spinach was sown in a field, which had been uniformly cultivated and manured but had been cropped differently on different plots. If spinach yields after potatoes are taken as 100%, the yields obtained after winter wheat were 63%, summer barley 72%, carrots 62%, and garden peas 112%.
244. DOMINION OF CANADA, DEPARTMENT OF AGRICULTURE, DIVISION OF ENTOMOLOGY.
Processed Publications Entomological Series, 1948 and 1949.
The following have recently been received:—
No. 84. Blister beetles, pp. 3 (by Mason, G. S.).
No. 88. White grubs, pp. 4 (by Hammond, G. H.).
No. 91. Carrot rust fly=*Psila rosae*, pp. 3 (by Glendenning, R., and Fulton, H. G.).
No. 98. Pea aphid=*Macrosiphum pisi*, pp. 3 (by Maltais, J. B.).
No. 102. Squash bug=*Anasa tristis*, pp. 3 (by Armand, J. E.).
No. 104. European corn borer=*Pyrausta nubilalis*, pp. 5 (by Wressell, H. B.).
No. 107. Pea moth=*Laspeyresia nigricana*, pp. 4 (by Glendenning, R.).

No. 110 [1949]. The oriental fruit moth in Ontario=*Grapholitha molesta*, pp. 7 (by Dustan, G. G., and Boyce, H. R.).

Garden vegetables.

- (See also 6, 9-12, 14, 15, 17, 24, 25, 32, 45-47, 144, 214-225, 227, 467, 477, 483, 493.)
245. OSIPOV, V. S.
Storing seed plants. [Russian.]
Sad i Ogorod (Orchard and garden), 1949, No. 9, pp. 42-4.
The conditions necessary for the successful winter storage of biennials required for producing next year's crop of seed are described. A table shows the temperatures and relative humidities recommended for the storage of root plants, cabbages and onions.
246. SCHUPHAN, W.
Neue Wege zur Sorten- und Artendiagnostik in der Samenprüfung durch spektralphotometrische Methoden. (Diagnosing varieties and species in seed testing by spectrophotometrical methods.)
Reprinted from *C. R. Ass. int. Ess. Semences*, 1948, 14: 2: 215-25, bibl. 8, illus.
[For a brief description of the author's new method of seed testing see *H.A.*, 19: 1740.] The application to *Brassica* seeds is discussed in the present paper, methanol being the extractant used. The diagrams reproduced show the spectrophotometrical absorption curves of cabbage and red cabbage varieties.—Staatsinst. angew. Botanik, Hamburg.
247. SIMS, G. T., AND VOLK, G. M.
Composition of Florida-grown vegetables. I. Mineral composition of commercially grown vegetables in Florida as affected by treatment, soil type and locality.
Bull. Fla agric. Exp. Stat. 438, 1947, pp. 31, bibl. 13 [received 1949].
The vegetables tested, including cabbage, beans, celery and tomatoes, were found to vary greatly in their mineral content when grown on different soils in different areas. Hence, it proved impracticable to give a representative figure for any given crop in Florida. The more general conclusions reached were (1) "High protein percentages in the crops were associated with organic soils such as those of the Belle

Glade area. High calcium and magnesium were associated with calcareous soils or those relatively high in exchangeable calcium and magnesium. (2) There was little correlation between fertilization or soil analysis and plant composition for a given area of similar soils. The factors that characterized soil types appeared to be organic matter content and pH of the soil. Other factors of soil environment and moderate differences in fertilization were of secondary importance." Extensive analytical data are tabulated.

248. WARE, L. M., AND JOHNSON, W. A.
Some effects of repeated applications of manures and fertilizers on the organic, nitrate, and moisture content of the soil and on the yield of truck crops.
Proc. Amer. Soc. hort. Sci., 1949, 53: 375-86, bibl. 4.

The organic content of the soils in Alabama on which this study was carried out for 7 years was very low. Treatment included a large range of combinations of fertilizers, organics and green manures. Results are tabulated. The patterns of the order of treatments and of the order of the relative amounts of organic matter, nitrates and moisture found in the soil and of crop yields obtained were remarkably similar. Effects in spring and autumn differed greatly. In the spring fertilizers had most effect. Highest crops, soil nitrates, soil organic content and soil moisture resulted from high applications of commercial fertilizer and animal manure. Green manures affected soil nitrates and crop yields much more in autumn than in spring. Commercial fertilizers did not directly or indirectly affect the amount of organic matter in the soil. Increase in percentage organic matter in soil due to legumes turned in was small but significant. Animal manure had the greatest effect in increasing the percentage of soil organic matter. It also increased significantly the average moisture content of the soil. [From authors' summary.]

249. DOLAN, D. D., AND CHRISTOPHER, E. P.
Effect of modified fertilizer ratio on yield of vegetables.
Proc. Amer. Soc. hort. Sci., 1949, 53: 402-6, bibl. 13.

Trials with peppers, tomatoes and celery clearly showed that there is no rule for vegetables in general but that the amount of fertilizer desirable varies with different types of vegetable, nitrogen, generally speaking, being the most important.

250. WARNE, L. G. G.
Spacing and "bolting" of vegetables.
Nature, 1949, 164: 969-70, bibl. 1.

In confirmation of Landau's results obtained with onions (*H.A.*, 19: 3134) it was found that wider spacing increased the percentage of bolting in beets, carrots and shallots. In rows 18 in. apart Altrincham carrots, for instance, had 1.6% bolters at a spacing of 11.3 plants per foot of row and 4.1 bolters at a spacing of 2.6 plants per foot. In contrast to Landau the author does not hold that these results are determined by competition for light. He suggests instead that wider spacing allows of more rapid growth, so that in shallots more flower heads will have emerged during the period of short days, while in the root crops "on any date

when bolting is progressing a greater proportion of the potential bolters will have actually bolted on the widely spaced than on the closely spaced plots". —Manchester University.

251. WATSON, M. A.
Some notes on plant virus diseases in South Australia.
J. Aust. Inst. agric. Sci., 1949, 15: 76-81, bibl. 4.

A virus affecting subterranean clover, *Trifolium subterraneum*, was transmitted by rubbing and by aphids to both garden peas and French beans as well as to other clovers, and proved distinct from the Yellow pea mosaic. A virus obtained from nemesis was transmitted to tobacco, tomato and petunia. It is believed to be a strain of the cucumber mosaic virus. Another virus, provisionally identified as a strain of the tobacco ring spot virus, was isolated from petunias and inoculated into tobacco and tomatoes with positive results. G.K.A.

252. THE ENTOMOLOGICAL BRANCH, DEPARTMENT OF AGRICULTURE, N.S.W.
The vegetable weevil (*Listroderes obliquus*).
Agric. Gaz. N.S.W., 1949, 60: 482-3, illus.

Vegetable weevils cause damage during the spring to potatoes and tomatoes, and carrots, turnips and parsnips may be devoured below ground and destroyed. Infested crops should be dusted or sprayed with DDT. For tomatoes a 2% dust is suggested, as at higher concentrations burning of young plants may occur. As a precautionary measure, the treatment of a wide swathe of ground round the seedbeds with a dry pollard bait (containing Paris green, benzene hexachloride or DDT) is recommended.

253. HELY, P. C.
Fuller's rose weevil (*Pantomorus godmani*).
Agric. Gaz. N.S.W., 1949, 60: 300-1.

The larvae of Fuller's rose weevil attack beans, early tomatoes, marrows, and cucumbers. The injury consists in the destruction of the fibrous roots and the gouging out of tissues from the main root. It is suggested that a rough working of the land in January or early February, followed by the sowing of a cereal crop in March, preferably an early maturing variety of oats, will give satisfactory control.

254. ASSOCIATED SEED GROWERS INC.
A study of mechanical injury to seed beans.
Asgrow Monograph 1, 1949, pp. 46, bibl. 18, illus.

A careful investigation into the causes and prevention of mechanical damage to bean seed, responsible for much unsatisfactory germination, was carried out by the Asgrow Department of Breeding and Research, and is reported here. Types of injury are classified. Damage is shown to be cumulative, and susceptibility of the seeds to increase as the water content decreases. Great damage is caused during threshing, and it is shown that the general purpose threshers commonly used commercially are unsuitable for bean seed. Combines especially designed for beans were constructed and tested with good results. During threshing constant attention has to be given to cylinder speed and the changing moisture content of the seed if injury is to be prevented. Unsuitable machinery and unneces-

sary impacts in the warehouse during processing are also responsible for much damage. Fast moving cup-type or airlift elevators and steep slopes should be avoided. Storage experiments indicate that mechanical damage does not occur during storage.

255. HUBBELING, N.

Veredelingsdoeleinden bij slabonen. (Aims of bean breeders.) [English summary 13 ll.] *Meded. Dir. Tuinb.*, 1949, 12: 528-40, bibl. 7, illus.

In addition to weather and soil conditions, factors of importance in breeding beans are: yield (size of pods, branching); precocity (sensitivity to day-length, first fertile node, length of internodes); reliability of crop (resistance to diseases). Reference is made, with illustrations, to Servus, a selected, very compact, stringless French bean suitable for cultivation under frames.

256. HOFFMANN, K. D.

Bean growing in the Gympie District [Queensland].

Qd agric. J., 1948, 68: 261-70, illus.

French beans are a major crop in the district which supplies the southern States in winter. Practical advice is given on choice of site, preparation of land, sowing, spacing, manuring, cultivation, irrigation, harvesting, and packing. A summer green-manure crop (e.g. Poonia pea, sorghum, Sudan grass, panicum) is usually grown in rotation with the beans. Dwarf varieties only are grown, the most popular being Brown Beauty. Others are: the Wonder varieties, Staley's Surprise (good in warmer months), Feltham's Prolific, and St. Andrew's.

257. VAN DER WANT, J. P. H.

De belangrijkste ziekten van de boon (*Phaseolus vulgaris* L.) in Nederland, in het bijzonder de virusziekten. (Diseases of the French bean (*Phaseolus vulgaris* L.) important in Holland, with special reference to virus diseases.) [English summary ½ p.] *Meded. Dir. Tuinb.*, 1949, 12: 553-67, bibl. 30, illus.

The most important French bean diseases occurring in Holland are: halo blight (*Pseudomonas phaseolicola*), sclerotinia disease (*Sclerotinia sclerotiorum*), grey mould (*Botrytis cinerea*), foot rot (*Fusarium* spp.), rust (*Uromyces appendiculatus*), blotch (*Ascochyta blight* and *A. phaseolorum*), anthracnose (*Colletotrichum lindemuthianum*), *Pleospora herbarum*, and the virus diseases. Methods of control of the bacterial and fungal diseases are briefly discussed, but the virus diseases (*Phaseolus* viruses 1 and 2) are treated in more detail with particular reference to symptoms.

258. BIOLOGICAL BRANCH, N.S.W. DEPARTMENT OF AGRICULTURE.

The scald disease of French beans.

Agric. Gaz. N.S.W., 1949, 60: 370.

The symptoms of this disease are the death of the margins and intervenal areas of the leaves, stunting of plants, dropping of flowers, and low yields. The scalding or death of the leaf tissue is preceded by chlorosis. It has been shown to be a molybdenum deficiency disease. Observations indicate that it may

be prevented by the use of seed grown in other districts, by the use of lime or dolomite, or by the use of molybdenum compounds. It is suggested that crude sodium molybdate be mixed with the fertilizer at the rate of ¼ to ½ lb. of the material per bag of fertilizer (160 to 187 lb. per bag).

259. YARWOOD, C. E.

Effect of soil moisture and mineral nutrient concentration on the development of bean powdery mildew.

Phytopathology, 1949, 39: 780-7.

On Pinto bean plants grown in a series of soil moisture levels, mildew (*Erysiphe polygoni*) developed more luxuriantly, host necrosis due to mildew was less, and reduction in green weight due to mildew infection was greater with low than with high soil moisture. On beans in water culture with concentrations 0 to 10 times that in Hoagland's solution mildew development increased, host necrosis due to mildew decreased, and the effect of mildew on green weight increased with increasing nutrient concentration, while plant growth was greatest at the standard concentration.—University of California, Berkeley.

260. BRAUNS, A., AND GERSDORF, E.

Zur Kenntnis der "Wurzelfliege". (Vorläufige Mitteilung.) (The fly *Hylemya radicum* on French beans. Preliminary communication.)

NachrBl. biol. Zentralanst. Braunschweig, 1949, 1: 91-4, bibl. 14, illus.

A preliminary survey of the incidence and ecology of *Hylemya radicum* in certain areas of Germany.

261. SPEYER, W.

Blütenbeschädigungen an *Vicia faba*. (Injuries of the blossom of *Vicia faba*.)

NachrBl. biol. Zentralanst. Braunschweig, 1949, 1: 133-5, bibl. 3, illus.

Field observations of broad beans showed frequent injuries of the calyx, apparently caused by the mandibles of some insect. A study of the insects visiting the flowers has not yet definitely disclosed the culprit.

262. HABRAN, R.

Chronologie du chou. Essai de classification des différentes espèces de choux. (History of the cabbage. An attempt at a classification of the different species of cabbage.)

Bull. hort., 1949, 67th year, No. 4, pp. 167-9, from abstr. *Ann. Gembl.*, 1949, 55: 161.

All cultivated cabbages are derived from the wild species *Brassica oleracea*. The author arranges the species and varieties of cabbage produced by cultivation and selection in 7 groups.

263. STEINHAUSER, F.

Eingriffe in die Vegetation und ihre Auswirkungen auf das Klima. (Interference with vegetation and its effect on climate.)

Jb. Hochsch. Bodenk. Wien, Vol. 2 (1948), 1949, pp. 11-15.

This review includes a few data—though no experimental details—on the increase of cabbage and red cabbage yields produced by windbreaks of several different materials.

264. DAWSON, C. D. R.
Tar oil winter wash will control cabbage root maggot.
Grower, 1949, 32: 1020-1.
Tar oil winter wash is reported as being used successfully for control of cabbage root fly maggot in Denmark. Field trials by a Surrey seed firm confirm the effectiveness of this material. A 1 or 2% solution applied to the soil round each plant, 3-4 days after the eggs were first observed, killed the eggs without damage to the plants. Two or three applications may be necessary. The material is cheaper and easier to apply than the standard control material, calomel dust.
265. BOOTH, V. H., AND DARK, S. O. S.
The influence of environment and maturity on total carotenoids in carrots.
J. agric. Sci., 1949, 39: 226-36, bibl. 16.
In order to develop their full t.c. [total carotenoids] concentration by autumn, carrot varieties with normal t.c. values must be sown [in Southern England] before the end of May. High-carotene varieties must be sown at least a month earlier. "Stecklings" grown from summer-sown seeds and examined in spring had only about a third of their fully mature t.c. value.—Cambridge University.
266. HERVEY, G. E. R., AND SCHROEDER, W. T.
The yellows disease of carrot.
Bull. N. York St. agric. Exp. Stat. 737, 1949, pp. 29, bibl. 25, illus.
Carrot yellows is caused by the aster yellows virus which in western New York is transmitted solely by the six-spotted leafhopper, *Macrostelus divinus* (Uhl.). The disease may be controlled in carrots by spraying with DDT three times during late July and August to kill the leafhoppers. Best results were obtained with a DDT spray containing 0.5% petroleum oil.—Cornell Univ., Geneva, N.Y.
267. KOHLS, H. L.
Chicory improvement in Michigan.
Quart. Bull. Mich. agric. Exp. Stat., 1949, 32: 20-2, bibl. 1.
Following the discontinuation of seed imports from Europe during the war, chicory yields in Michigan began to drop. Promising strains are now being developed that combine high yields with a low percentage of bolting and other desirable characters.
268. SHIFRIS, O.
A developmental approach to the genetics of fruit color in *Cucurbita pepo* L.
J. Hered., 1949, 40: 233-41, bibl. 8, illus.
"The purpose of this paper is to describe the major fruit colour groups in *Cucurbita pepo* L. and discuss their genetical basis as far as it can be ascertained from available data. The character of fruit colour is viewed as a developmental rather than as an end product manifestation; it is conceived as a sequence of events, including changes in hue, in intensity of colour and pattern, from anthesis until after ripening." By the use of a reference table which contains accurate developmental histories of known strains it is now possible to predict the breeding behaviour of many phenotypes, and to differentiate between homozygotes and heterozygotes. Thus it has been determined that most of the persistent colour types, as well as some lines in other groups, will breed true on selfing.—W. Atlee Burpee Co., Fordhook Farms, Pa.
269. HOWE, W. L.
Factors affecting the resistance of certain cucurbits to the squash borer.
J. econ. Ent., 1949, 42: 321-6, bibl. 7, illus.
Thirteen varieties of squash and pumpkin studied at the New York Geneva Station showed marked differences in resistance to attack by the squash borer. *Melittia cucurbitae*. The factors responsible for these differences are discussed.
270. GILLARD, S. O.
Growing early cucumbers for market.
Bull. N.Z. Dep. Agric. 298, revised 1949, pp. 14, illus.
In the glasshouse, in frames, and out of doors under "hotcaps" made of white, waxed paper.
271. ZOBEL, M. P., AND DAVIS, G. N.
Effect of the number of fruit per plant on the yield and quality of cucumber seed.
Proc. Amer. Soc. hort. Sci., 1949, 53: 355-8, bibl. 2.
Maximum seed yield of cucumber was obtained when the greatest number of fruits matured. The quality of seed was not influenced by regulation of the number of fruits allowed to mature per plant.—Kingston, R.I.
272. TULIŽENKOVA, F. F.
Growing cucumbers and onions in moss.
[Russian.]
Sad i Ogorod (Orchard and garden), 1949, No. 8, pp. 65-7.
A method of growing vegetables in moss to which is added a suitable nutrient solution is recommended for the far north of Russia. As a substitute for ordinary soil, moss, which is plentiful on the tundras, has several advantages, viz. it holds water well; roots can be firmly established in it; it is ideal for aerating the roots; as it gradually decomposes it provides an additional nutrient for plants growing in it. Data are given showing favourable results obtained with cucumbers and onions grown in moss in a greenhouse.
273. HALL, W. C.
Effects of photoperiod and nitrogen supply on growth and reproduction in the gherkin.
Plant Physiol., 1949, 24: 753-69, bibl. 42, illus.
The development and growth of vegetative and reproductive organs, as well as the composition of plants and nutrient substrate, were studied in the common gherkin (*Cucumis anguria*) from the early vegetative phase to maturity. Plants were grown in greenhouse conditions in gravel culture, and the effects and interaction of high and low nitrogen nutrition and long and short days (photoperiods of 8 and 16 hours) were compared. As vegetative growth and certain aspects of reproduction in cucurbits are highly responsive to day-length and nitrogen supply, the gherkin was selected as the experimental species on the basis of the day-neutral character of its flowering response, which facilitated recognition of the vegetative responses. Detailed observations are recorded.—Agricultural and Mechanical College of Texas.

274. TJALLINGII, F.

Virusziekten van komkommerachtige gewassen, in het bijzonder van augurken. (Virus diseases of cucurbitaceous crops, particularly of gherkins.) [English summary $\frac{1}{2}$ p.] *Meded. Dir. Tuinb.*, 1949, 12: 584-93.

Mosaic disease caused by cucumber mosaic virus 1 is one of the most widespread and dangerous diseases of gherkins (*Cucumis sativus* L.) in Holland. Both typical mosaic symptoms on leaves and fruits, known as "mottle", and wilting of the plant and necroses may occur. Wilting occurs only at a distinct stage shortly after the disease develops called the "critical period" and only under definite weather conditions. The highly resistant Japanese variety Tokyo, obtained from U.S.A., is unsuitable for pickling, but it has now been crossed with the very susceptible commercial variety Baarlose Nietplekker in order to raise a strain of high commercial value which is at least tolerably resistant.

275. THOMPSON, R. C.

Lettuce growing in greenhouses.

Fmrs' Bull. U.S. Dep. Agric. 1418, revised 1949, pp. 25, 10 cents.

Instructions for cultivation are followed by notes on diseases and pests and their control. Centres of the lettuce forcing industry in the U.S. are Boston, Mass.; Grand Rapids, Mich.; Rochester, N.Y.; and Ashtabula, Cleveland, and Toledo in Ohio. The two important varieties are Grand Rapids and Bel-May. Seed production is also briefly discussed.

276. VOSKRESENSKAJA, N. P.

The effect of nitrogen nutrition and illumination on the accumulation of organic substances and the amount of chlorophyll a and b in lettuce. [Russian.]

Doklady Akad. Nauk S.S.S.R., 1949, 67: 161-4, bibl. 6.

A change in nitrogen nutrition level causes a change not only in the general quantity of green pigments but, in normal illumination, in their relation to one another. A high nitrogen level mitigates the decrease in the accumulation of organic plant substances under low illumination.

277. CLARK, B. E., AND WITTWER, S. H.

Effect of certain growth regulators on seed stalk development in lettuce and celery.

Plant Physiol., 1949, 24: 555-76, bibl. 33, illus.

Lettuce and celery plants were treated with aqueous solutions of 2,4-dichlorophenoxyacetic acid (2,4-D), alpha-orthochlorophenoxypropionic acid (CLPP), 2,3,5-triiodobenzoic acid (TIBA), para-chlorophenoxyacetic acid (CLPA), and naphthaleneacetic acid (NAA). In general, when any one of these substances was applied to 8- to 12-week-old lettuce plants, seed stalk elongation was hastened, the effect being greater for repeated than for single applications. In contrast, however, in the one case in which CLPP was applied to month-old plants there was a significant retardation. The effects of growth substances, whether retarding or stimulating, occurred during the early stages of seed stalk elongation and were associated with a corresponding effect on the date of flowering. Alterations in seed stalk development induced by the applications of growth

substances were transmitted to the progeny of the treated plants. In an experiment conducted to determine the effect of variety, induction treatment, and growth regulators (2,4-D and CLPP) on the morphological development, phytohormone content, and elongation of celery stems, only thermally induced Cornell 19 plants produced seed stalks. Among these, elongation was slightly retarded by 50 p.p.m. 2,4-D and not affected by 100 p.p.m. CLPP. On a comparative basis, those factors which caused seed stalk formation were associated with a high concentration of phytohormones in the stem apices during the induction period, a low concentration during the period just preceding flower differentiation and a high concentration again at the time of the differentiation of primordial umbels. Because of the variability in the responses of plants to the application of synthetic growth regulators, these substances cannot yet be recommended for the practical control of seed stalk development. Nevertheless, although no clear-cut treatments for retarding or accelerating bolting have been indicated, several phases of the problem have been elucidated. [Authors' summary and conclusions.]—Michigan State College, East Lansing.

278. MINISTRY OF AGRICULTURE, LONDON.

Onions and related crops.

Bull. Minist. Agric. Lond. 69 (3rd edition), 1949, pp. 38, 12 plates, 1s. 3d.

The new edition of this bulletin deals with the production in the U.K. of onions, shallots, garlic and leeks. The cultivation of tree onions, chives, rocambole, Welsh onions and other species grown mainly in private gardens has been omitted. A fuller account, however, is given of the production of onions from sets, and of pest and disease control. Local practices in the main producing centres, i.e. the Eastern Counties, Kent, Wales and Northumberland, are described. [For abstract of the 2nd edition of this bulletin, see *H.A.*, 14: 236.]

279. JONES, H. A., PERRY, B. A., AND EDMUNDSON, W. C.

Vegetative propagation of short-day varieties of onions as an aid in a breeding program.

Proc. Amer. Soc. hort. Sci., 1949, 53: 367-70.

Certain varieties which bulb under a short photoperiod are harvested in Texas in late March or early April. They are then cured, shipped to Colorado and stored till about 15 July when they are planted. The resulting plants form several branches and under conditions of high temperature and long days a cluster of bulbs. These can be stored for several months till wanted for planting.

280. SPEAR, I., AND THIMANN, K. V.

The effect of onion juice on the growth response to auxin.

Plant Physiol., 1949, 24: 587-600, bibl. 18.

The reported effect of onion juice in enhancing the physiological activity of auxins on plants was studied using the curvature of slit pea stems and the straight growth of pea stem sections. Onion juice does increase the growth-promoting activity both of indoleacetic acid and 2,4-D in these tests. The effect is not due to an auxin in the onion juice, and resides in the ether-insoluble fraction of the juice. Analysis of the juice demonstrated a considerable content of reducing

sugar and phosphate, and when these constituents, in approximately the concentration in which they are present in the juice, are substituted for onion juice they have nearly the same effect. Sucrose was as effective as glucose and the optimum concentration of potassium phosphate was 4×10^{-3} M. Potassium chloride alone could duplicate more than half the effect of onion juice. The combination of potassium chloride and 0.3% sugar was about as effective as that of potassium phosphate and 0.3% sugar, and either combination approximately duplicates the effect of the onion juice. Mannitol was ineffective as a substitute for sugars. It is concluded that the action of onion juice is due to its content of sugar, phosphate and potassium ions. [Authors' summary.]—Harvard University.

281. WILCOX, E. B., AND MORRELL, K. E.
The vitamin content of peas as influenced by maturity, fertilizers, and variety.
Bull. Utah agric. Exp. Stat. 337, 1948 [or 1949?], pp. 16, bibl. 17.

Fifteen varieties of canning and freezing peas were tested. Retention of ascorbic acid did not vary much with increasing maturity until tenderometer value of the peas went over 125. Percentage retention in canned Perfection peas varied from 34 to 51 and in the frozen peas from 57 to 83. Carotene content showed a greater decrease as the peas increased in maturity above a tenderometer value of 114. Nitrogen applications had little effect on ascorbic acid and thiamine, but increased the carotene content. Figures are given of quality and of vitamin content in the different varieties.

282. WELLS, D. G., HARE, W. W., AND WALKER, J. C.
Evaluation of resistance and susceptibility in garden pea to near-wilt in the greenhouse.
Phytopathology, 1949, 39: 771-9, bibl. 7, illus.

Experiments designed to develop a standardized technique for testing peas for reaction to the near-wilt disease (*Fusarium oxysporum* f. *pisi* race 2) showed that uniform and consistent results could be obtained by planting seedlings in clean quartz sand and inoculating 7 to 10 days later by cutting the roots about 1 in. below the seed while they were immersed in a spore and mycelial-fragment suspension.—University of Wisconsin, Madison, Wis.

283. HAGEDORN, D. J., AND WALKER, J. C.
Wisconsin pea streak.
Phytopathology, 1949, 39: 837-47, bibl. 13, illus.

Wisconsin pea streak and the causal virus are described. The most obvious symptoms on pea in the field are a necrotic streaking of the stems and petioles and node browning; in the greenhouse, symptoms are browning at the nodes and wilting. The pea aphid was not found capable of transmitting the virus, and seed transmission was not observed.—Univ. of Wisconsin, Madison, Wis.

284. KALININ, F. L.
The culture of immature embryos of radish (*Raphanus sativus* L.) in artificial environments. [Russian.]
Doklady Akad. Nauk S.S.S.R., 1949, 66: 1191, bibl. 5, illus.

Experiments on radish embryos removed from the ovules and grown in pure culture in tubes.

285. HOOS, S., AND HABIB, P. C.
California spinach. Economic status 1948-1949.
Circ. Calif. agric. Exp. Stat. 393, 1949, pp. 18.

This circular presents trends in production, yields, utilization and prices in the Californian spinach industry during the period 1919-48.

286. LEGGATT, C. W., AND INGALLS, R. A.
Size of seed in relation to size and shape of root in swede turnips.
Sci. Agric., 1949, 29: 357-69, bibl. 10.

Seed of swede turnips of the Laurentian variety was screened into five fractions of different mean sizes which were tested in the laboratory for germination speed and germination capacity and in the field for yield, shape and uniformity of roots. Seeds of small size were in general as prompt to germinate and of as high germination capacity as seeds of large size, but failed to give as good a stand in the field in some plots. Roots produced by the smallest size of seed tended to be flatter in shape than those produced by the larger sizes, but did not differ significantly from the latter in mean size or in uniformity of size. Owing to the difference in shape of the roots produced by seeds of the smaller sizes and their failure to become satisfactorily established in the field, it is recommended that the smallest size group be removed from seed stock.—Seed Research Laboratory, Ottawa, and Division of Plant Products, Sackville, N.B. [Authors' summary.]

287. HASKELL, G.
New sweet corn from America.
Agriculture, 1949, 56: 410-15, illus.

Variety trials were held at the John Innes Horticultural Institution, Merton, during 1948 of nearly 80 carefully selected strains of sweet corn brought from America, to test their behaviour under English conditions. Extra Early Bantam, John Innes Hybrid No. 1, and Canada Gold were used as controls. Detailed results are tabulated. Although the Spancross lines bred by Dr. W. R. Singleton were the first to be harvested, their yields were low. Extra Early Bantam proved to be still one of the earliest strains for this country and yielded well. Northern Cross matured slightly later but outstripped all others in yield and plant characters, such as uniformity and resistance to frit fly. The excellent germination of Northern Cross indicated that it might be cold-hardy to English soil conditions. It is hoped to re-test this and other promising hybrids to see whether they can be sown earlier and therefore harvested sooner.

288. MINISTRY OF AGRICULTURE, LONDON.
Sweet corn.
Adv. Leaflet. Minist. Agric. Lond. 297, 1948, pp. 4.

Varieties and cultivation practices suitable for English conditions are recommended.

289. BOWERS, J. L.
Sweet corn variety testing program in Mississippi.
Circ. Miss. agric. Exp. Stat. 142, 1948, pp. 8.

Results tabulated according to marketable yield, ear-worm damage and quality tests.

290. ANDEWEG, J. M.

Veredelingsdoeleinden en resultaten bij de tomaat. (The aim of tomato breeding and the results obtained.) [English summary $\frac{1}{2}$ p.] *Meded. Dir. Tuinb.*, 1949, 12: 506-15, bibl. 9.

Tomato breeding is discussed under: heredity and physiology; earliness; quality; disease resistance; heterosis. Immunity for, or resistance to diseases and pests, e.g. *Cladosporium fulvum*, verticillium wilt and eelworm, can be obtained by crossing commercial varieties with immune varieties or botanical species.

291. DICKEY, R. S., AND ARK, P. A.

Injury caused by treating tomato seed with mercurials.

Abstr. in *Phytopathology*, 1949, 39: 859.

In greenhouse tests $HgCl_2$ and New Improved Ceresan caused a considerable depression of germination in tomato seeds (var. Pearson) when the ratio of the seed to the treating solution was 1 to 300 and the duration of the treatment from 10 to 15 min. and readings on germination taken for 32 days.

292. JUILLET, —.

Parthénocarpie de la tomate et substances de croissance. (Parthenocarp of tomato and growth substances.)

C.R. Acad. Agric. Fr., 1949, 35: 347-50.

Results are presented and discussed of attempts to induce parthenocarp in tomato plants in the open field, using β -naphthoxyacetic acid alone or with the addition of 2,4-D. The advantages obtained were (1) improved appearance of the fruits and an increase in their density and volume, (2) increase in yield by 30% (10% of marketable fruit), and (3) early ripening.

293. WITTWER, S. H.

Effect of fruit setting treatment, variety and solar radiation on yield and fruit size of greenhouse tomatoes.

Proc. Amer. Soc. hort. Sci., 1949, 53: 349-54, bibl. 8.

Mechanical vibration and a spray containing 40 p.p.m. β -naphthoxyacetic acid and 10 p.p.m. *p*-chlorophenoxyacetic acid were applied to a spring and an autumn crop of tomatoes. In 7 varieties grown in the spring fruit size was increased, but significant yield increases occurred only in American forcing varieties. On the other hand the 9 varieties grown in the autumn showed increased yield but no significant increase in size. Results are discussed.—East Lansing.

294. WITHNER, C. L.

B-vitamin changes during growth of cucurbit and tomato fruits.

Amer. J. Bot., 1949, 36: 517-25, bibl. 5, illus.

This study is an extension of the work published in 1947 by K. S. Wilson [see *H.A.*, 18: 1115] in which the changes in concentration of thiamin, riboflavin and niacin in fruits of several races of cucurbits were investigated. In the present study "a series of developmental stages of tomato and cucurbit fruits were selected for assays of ten B-vitamins in an attempt to find evidence of biochemical control of growth and development, especially as to fruit size differences.

Correlations were therefore made between the vitamin patterns, as expressed by the changes in concentrations of B-vitamins during development, and the growth patterns of varieties with different-sized fruits. The correlations of Kjeldahl nitrogen content and percentage dry weight with the vitamin patterns and fruit development were also attempted."—Yale University.

295. WITHROW, A. P., AND WITHROW, R. B.

Photoperiodic chlorosis in tomato.

Plant Physiol., 1949, 24: 657-63, bibl. 4, illus.

A typical chlorosis has been observed in the leaves of tomato plants subject to continuous radiation. The investigation reported here was undertaken at the Smithsonian Institution, Washington, to study this photoperiodic chlorosis further and to determine the effect of length of photoperiod, intensity of radiation, and temperature on the chlorophyll content of tomato leaves. The Indiana Baltimore tomato was used throughout. Results indicate that chlorosis is controlled by the length of the photoperiod, and that it appears at photoperiods of longer than 18 hours when incandescent lamps are used as the sole source of radiant energy. It further occurs in response to relatively low irradiances of 4 and 20 f.c. applied as a supplement to a short high irradiance photoperiod. When plants are grown at low temperatures (12° C.) the length of the photoperiod has relatively little effect on the chlorophyll concentration in the leaves, and the typical severe chlorotic pattern developed at higher temperatures is absent.

296. LEONE, I. A., AND SHIVE, J. W.

Effects of variations in N and P nutrition on renewal of growth in transplanted tomato seedlings.

Soil Sci., 1949, 68: 237-50, bibl. 23.

Marglobe tomato seedlings were grown at different nitrogen and phosphorus levels in an attempt to correlate the carbohydrate reserve accumulated in the plants at each nutritional level with observed responses of the plants to severe handling treatment prior to transplanting. Plant size increased with increase in available nitrogen and phosphorus to a given level, beyond which an increased supply of either 'nutrient element was unaccompanied by further increase in growth. Plants that had received a moderate nitrogen supply (100 p.p.m.) and a low but not seriously deficient phosphorus supply (2.5 p.p.m.) were best able to initiate and continue good growth when transplanted to standard nutrient after exposure to severe wilting conditions. [From authors' summary.]

297. THORNE, D. W.

Calcium carbonate and exchangeable sodium in relation to the growth and composition of plants.

Proc. Soil Sci. Soc. Amer. 1946, 1947, 11: 397-401, bibl. 4 [received 1949].

The colloidal clay technique was used to investigate the influence of calcium carbonate on the growth and composition of barley and tomato plants. With a calcium-saturated clay mixed with sand the growth of Stone tomato plants was somewhat inversely proportional to calcium carbonate concentration in the culture medium. The decreased growth was associated with increases in calcium and decreases in potassium

and phosphorus concentration in the plants. The growth and composition of tomato plants was also studied in clay cultures in which 3 levels of calcium carbonate were mixed in combination with 4 different ratios of exchangeable sodium to calcium. Growth decreased with increasing degrees of sodium saturation and the effects of sodium were accentuated by the presence of calcium carbonate. At each level of exchangeable sodium the concentration of both sodium and calcium in the plants increased with added increments of calcium carbonate; but at constant calcium carbonate levels sodium increased in the plants with added exchangeable sodium and the calcium decreased. Phosphorus content of the plants was increased by exchangeable sodium and decreased by calcium carbonate.—Utah Agric. Exp. Stat., Logan.

298. PHILLIPS, C. D., AND EVANS, H. C.
Packing and shipping green-wrapped tomatoes in different types of containers.

Bull. Ky agric. Exp. Stat. 527, 1948, pp. 19.

The merits and demerits of different types of container are discussed. The chief losses, in descending order of importance, occurred as the result of premature picking, late blight, rough handling especially before shipping, maladjustment or impurities in the grading machinery.

299. FRASER, L.
Shatter—a virus disease of tomatoes.

Agric. Gaz. N.S.W., 1949, 60: 419-21, illus.

A disease, to which the name "shatter" has been given, appeared in several areas in New South Wales in 1942-43. In some crops in the Windsor-Richmond area more than 50% of the plants were affected. It has since appeared sporadically but shows no signs of becoming serious. Small dark-brown necrotic areas of variable shape, roughly circular or angular and irregular, appear between the main veins, and necrotic streaks from less than 1 mm. to a little over 2 mm. may border the main or lateral veins. The necroses are usually most numerous towards the base of the leaflets. The disease is readily transmitted by grafting to tomato seedlings, and is assumed to be caused by a virus.

300. LOEST, F. C.
Bacterial canker of the tomato.

Fmg S. Afr., 1949, 24: 393-4; 412, illus.

Bacterial canker of tomatoes, caused by *Corynebacterium michiganense*, was first known to occur in S. Africa in October, 1948. This paper is issued by the Subtropical Horticultural Research Station, Nelspruit, to enable farmers to recognize the disease and to prevent or limit its spread.

301. WALKER, J. C., AND OTHERS.
The limitations of spraying tomatoes in Wisconsin.
Res. Bull. Wis. agric. Exp. Stat. 152, 1944, pp. 23, bibl. 3 [received 1949].

The chief diseases for which spraying appears necessary are early blight (*Macrosporium solani*) and leaf spot (*Septoria lycopersici*). Trials in Wisconsin and elsewhere show that raising the fertility of the soil is more likely to ensure the unretarded and uninterrupted rate of fruit production desirable than the use of fungicides.

302. LOCKE, S. B.
Resistance to early blight and septoria leaf spot in the genus *Lycopersicon*.

Phytopathology, 1949, 39: 829-36, bibl. 12.

Small differences in susceptibility to early blight (*Alternaria solani*) and septoria leaf spot (*Septoria lycopersici*) were found among 15 common tomato varieties by means of artificial inoculation.—Agricultural Experiment Station, Fayetteville, Arkansas.

Mushrooms.

(See also 482.)

303. EDWARDS, R. L.
Science in the mushroom industry.
Agriculture, 1949, 56: 434-42, bibl. 41.

A survey of the progress that has been made in the science of mushroom growing, in particular mushroom nutrition, synthetic composts, diseases, pests and general cultural methods that have arisen as a direct result of research.

304. ANON.
[Mushrooms] Grown—but not eaten!
Fruitgrower, 1949, 108: 574-5, illus.

An account of the highly mechanized methods of production at the Scottish Mushroom Laboratories, Millerston, where the area under cultivation is 250,000 sq. ft. The tray method of production, for which special pasteurizing houses are being constructed, is replacing the bed method in the newer houses, but the use of trays is only advocated for mechanized farms. Lorries for transport of soil are equipped with steam grids, by means of which soil is sterilized before unloading. Methods of spawn production are not described in detail.

305. BAUDEWIJN, J.
La culture du champignon. (Cultivation of mushrooms.)
Rev. Agric., 1949, 2: 3-18, from abstr. in *Ann. Gembl.*, 1949, 55: 165.

A short historical account of the scientific research done on *Psalliota campestris* is followed by a description of the life cycle of the mushroom and recommendations for control of pests and diseases. A copy is given of the legislation on the sale of edible fungi in Belgium.

306. COURTIEU, P.
Le gobetage dans les cultures de champignon de couche; son influence sur le rendement et sur la composition chimique des carpophores. (The covering of mushroom beds; its influence on yield and chemical composition of the sporophores.)
Ann. agron. Paris, 1949, 19: 770-81, bibl. 9.

The composition of the soil with which the inoculated horse manure is covered was found to have a definite influence on shape and analysis of the sporophores. By varying the composition of the covering layer it is, in fact, possible to produce at will differently shaped fruit bodies. The following recommendations are made for best results: pH, 7.2-8.2; organic nitrogen, 0.007-0.018 per cent; active calcium, 2-5 per cent. The experiments indicate the great influence on the mycelium of nutrients contained in the manure and in the covering layer.—Arbois, Jura.

Potatoes.

(See also 6, 31, 448-450, 452, 458, 479, 489.)

307. DIVISION OF PLANT INDUSTRY, DEPARTMENT OF AGRICULTURE, N.S.W.

Breeding better potatoes at New England experiment farm to improve yield, quality, and disease resistance.

Agric. Gaz. N.S.W., 1949, 60: 345-8, illus.

This article describes the work that is being carried out at the New England Experiment Farm at Glen Innes, N.S.W. Better strains of existing varieties of potato have been produced, suitable introduced varieties have been brought into commercial use, and better new varieties have been released. The varieties Moona, Monak and Adina, the first to be produced and released (in 1948) by the Department, are described; under test they have proved their superiority to the standard variety Factor in yield of marketable tubers.

308. GARBUZOVA, A. P.

The inheritance of useful characters. [Russian.]

Priroda (Nature), 1949, No. 7, pp. 57-9, bibl. 6.

From data tabulated the author concludes that the addition of boron to an NPK fertilizer increased the yield and starch content of potato tubers not only in the same year but also of the [vegetative] progeny in the 4 succeeding years when boron was not added.

309. EMMERT, E. M.

Effect of late applications of nitrogen and potassium on potato yields.

Bull. Ky agric. Exp. Stat. 529, 1949, pp. 23.

Factorial plots indicated that the application of all the nitrogen at planting was of little value but that application of half then and half after bloom resulted in maximum yields. Field trials with both N and K showed that it paid to keep N well above 1,600 p.p.m. in the plant in the later stages and that late applications of K were also highly efficacious.

310. SCHRUMPF, W. E.

Practices, costs, and tuber bruising in digging potatoes in Aroostook County, Maine.

Bull. Me agric. Exp. Stat. 472, 1949, 53 pp. illus.

Owing to climatic conditions the time available for harvesting the large potato crop of Aroostook County is short, and rapid handling is essential. An investigation into the rates and costs of digging potatoes in this county is here reported. Data are presented on the effects of digging equipment and field conditions on rates and costs of digging and amount of tuber bruising. The application of a combine digger-picker machine, now in process of development, to conditions in Aroostook County is also discussed. In recent trials the use of an experimental combine increased the rate of harvesting and reduced tuber bruising very considerably.

311. KASSANIS, B.

Potato tubers freed from leaf-roll virus by heat.

Nature, 1949, 164: 881, bibl. 4.

In pursuance of earlier experiments potato tubers of the varieties Majestic and Arran Consul infected with

both leaf-roll virus and potato virus X were kept at 37.5° C. in a moist atmosphere. None of the tubers that survived the heat treatment for 25 days showed any symptoms of leaf-roll when planted in pots, whereas the controls were 100% infected. Virus X was not affected by storage at high temperature.—Rothamsted.

312. ROBERTS, J. D.

Virus-tested potato stocks.

Scot. Agric., 1949, 29: 64-8.

The author describes the methods whereby the Strathallan Growers Association is working to eliminate virus X or at any rate render its incidence unimportant among Scottish potato stocks.

313. ROLAND, G., AND FAGEL, G.

Contribution à l'étude de la transmission du virus Y (*Solanum virus* 2, Orton). (The transmission of potato virus Y.) [Summary in Dutch 5 ll.]

Parasitica, 1949, 5: 48-53, illus.

The authors confirm the conclusions of Watson and Roberts [*H.A.*, 10: 1086] regarding the "non-persistent" character of the Y virus.

314. MINISTRY OF AGRICULTURE, LONDON.

Potato and tomato blight.

Adv. Leaf. Minist. Agric. Lond. 271, 1949, pp. 6, illus.

The symptoms of potato blight and of tomato blight are outlined and control measures described. Tomato blight is caused by the same fungus that produces potato blight or by a different strain of it.

315. RICH, A. E.

Effect of various methods of killing potato vines on rate of defoliation and internal discoloration of tubers.

Abstr. in *Phytopathology*, 1949, 39: 862-3.

Sulphate of ammonia (2 lb. per gal.) gives a satisfactory kill with a minimum amount of tuber injury; it is non-poisonous, a nitrogen carrier, not a fire hazard, and readily available.

316. KIRIENKO, M. V.

Potato infected with Armillaria. [Russian.]

Priroda (Nature), 1949, No. 7, pp. 59-60.

Describes the occurrence of *Armillaria mellea* rhizomorphs on potato tubers in a Ukrainian field which had been cleared of trees many years previously and was 1.5 km. from the nearest wood.

317. SANFORD, G. B.

Prevention of early decay of cut potato sets by chemical treatment.

Sci. Agric., 1949, 29: 345-50, bibl. 9, illus.

Various chemicals for protecting freshly cut potato sets, planted in field soil, against attack by *Fusarium coeruleum* were compared in controlled-laboratory experiments. The soil was artificially infested with the pathogen, maintained at a temperature of 61° F. and a water content (30% m.h.c.) about optimum. Untreated sets were severely rotted within 21 days, but when the sets were dusted with Fermate, or when Ceresan or Lunasan were applied as dip treatments, or Sperguson used as a dust or applied as a dip (1% active ingredient), they remained sound.

ets treated with Semesan Bel, Dithane, yellow oxide of mercury, mercuric chloride, sulphur, or calcium hydroxide were afforded inadequate protection. Apparently the pathogen rotted untreated sets more when the soil was rather dry (23% m.h.c.) than when fairly wet (44% m.h.c.). Excepting Ceresan and Lunasan, the chemicals used were not obviously detrimental to sprout vigour. Ceresan suppressed the sprouts and Lunasan stunted them. Spergon seemed to increase sprout vigour. [Author's summary.]—Dom. Lab. Plant Path., Edmonton, Alberta.

18. TASCHENBERG, E. F.

Control of the potato aphid on tomatoes.

Bull. N. York St. agric. Exp. Stat. **736**, 1949, pp. 21.

Against *Macrosiphum solanifolii* on tomatoes dusts of benzene hexachloride and of nicotine gave effective control in field trials. Parathion as a dust was promising and as a spray gave excellent control. Sprays of 5% DDT in a miscible solvent and of benzene hexachloride containing 25% of the gamma isomer promised well as aphicides and did no damage to plants when used on three occasions, the first 30 days after the plants were set out in the field. Parathion residues were noted.

19. DIRECTIE VAN DE LANDBOUW.

Voorschriften voor bestrijding van de aardappelmoehheid: (Advice on the control of potato sickness.)

Verlag. Meded. PflZiektDienst **112**, 1949, pp. 14.

Instructions are given on the control of potato sickness caused by the potato eelworm, *Heterodera rostochiensis* particularly with regard to adequate crop rotation. Official regulations regarding the disease are appended.

20. RAWLINS, W. A., STAPLES, R., AND DAVIS, A. C.

Wireworm control with several insecticides introduced into the soil.

J. econ. Ent., 1949, **42**: 326-9, bibl. 3.

Six soil insecticides were tested against the wheat wireworm and the eastern field wireworm in potato crops over a 2-year period. Benzene hexachloride gave practical control at 0.5-1 lb. per acre, except in one experiment where 2 lb. per acre refined grade benzene hexachloride was needed. Toxaphene gave very poor control. Applications of 8 lb. per acre of chlordan gave consistently good results, and half quantities were sufficient for light infestations. Heptachlor gave good control at 2-4 lb. per acre. In preliminary experiments, Compound 118 showed considerable promise.—Cornell University, Ithaca.

Tobacco.

(See also 6, 440, 485, 486.)

21. JOHNSON, J., AND HEGGESTAD, H. E.

Certified tobacco seed.

Bull. Wis. agric. Exp. Stat. **458**, 1943, pp. 24 [received 1949].

A plea for the use of pure seed and information on how this can be assured.

322. CURCIO, M.

Osservazioni sulla germinazione dei semi di tabacco. (Notes on the germination of tobacco seeds.)

Tabacco, 1949, **53**: 49-53.

The author, after pointing out that age, poor storage and incomplete ripening will affect germinative capacity, gives details of Pieper's germination figures for 10 types of tobacco grown in Italy. Knowledge on this point should be of considerable value in arranging seedbeds and in recognition of species botanically closely related.

323. ISTITUTO SCIENTIFICO SPERIMENTALE PER I TABACCHI.

Adunanza del Consiglio Direttivo dell'Istituto Scientifico Sperimentale per i Tabacchi e Relazione sull'attività tecnica durante l'esercizio 1947-1948. (Proceedings of the Council and Report of the Tobacco Experiment Station, Rome, for 1947-48.)

Tabacco, 1949, **53**: 67-84.

The present difficulties and inadequate accommodation of the Italian Tobacco Research Station are noted and hopes are expressed for better quarters and facilities. Most of the staff are at present on field work, where the main projects concern selection or methods of cultivation. Other trials, some in collaboration with private individuals or firms, concern cover cropping, the effects of potassium on burning quality, manuring in general, growth in semi-shade, acclimatization, inducement of polyploidy (in conjunction with the Electro Genetic Station of Rome), hybridization of *N. tabacum* and *N. rustica*, and the special methods of selection proposed by Professor Dojnni for use with *N. rustica* species and Virginia Bright. At the University of Pavia work is in progress on the effect of vitamins and hormones on tobacco seed. Initial results indicate very promising results in germination and growth. The effects of different concentrations of gammexane on the tobacco plant are under observation and the indications are that its use can at present only be recommended if it is applied some time before planting. Oidium on tobacco has been the subject of a detailed survey and control and preventive measures are under way. The nutrition of the tobacco plant with special reference to deficiency of minor elements and environmental factors is the subject of recently initiated large-scale research. Tobacco virus diseases and all their ramifications are under examination. Very many other phytopathological problems are being attacked from different angles and in different places. Other projects concern the curing and preparation of the final products. The official organ of the Institute is *Il Tabacco*, where in course of time definite progress is likely to be reported on some at least of the almost too numerous subjects raised in the present report.

324. PAL, N. L., AND KADAM, B. S.

Suppression of axillary buds in the tobacco plant.

Nature, 1949, **164**: 716-17.

A small quantity of petroleum jelly was smeared over the axillary buds of tobacco plants immediately after topping. The buds withered and did not give rise to suckers. The treatment proved successful in all varieties tested. It is suggested that the application of this method will not only reduce or save the cost of

suckering, but it will enable the farmer to retain a larger number of leaves without affecting their quality. Investigations with other chemicals are in progress.—Central Tobacco Research Institute, Rajahmundry, India.

325. JOHNSON, J., OGDEN, W. B., AND ATTOE, O. J.

Experiments on the leaf-burn of tobacco
Res. Bull. Wis. agric. Exp. Stat. 153, 1944, pp. 75, bibl. 123 [received 1949].

The factors affecting leaf burn are discussed. Leaf burn is a term applied to the duration of glow of leaf tobacco following ignition at a temperature only sufficient for combustion to start. The ability to glow for a long time is essential to cigar tobaccos. The amounts of potassium and chlorine in the soil are particularly important.

326. SCARAMUZZI, G., AND BERTOSSI, F.
Effetti sulla pianta di tabacco di prodotti a base di gammaesano e possibilità di un loro uso nella lotta contro alcuni insetti del terreno. (The effect on the tobacco plant of "gammexane" products and their possible use against soil insects.)
Tabacco, 1949, 53: 35-48, bibl. 30.

The experience of other workers and the initial results of their own trials lead the authors to consider that while giving considerable promise, gammexane products, as recommended at present, may be used effectively and without danger only provided that they are applied to the soil some time before sowing—which will vary according to rainfall—and are well incorporated with the soil. Efficacious but non-phytotoxic concentrations of the substance have yet to be determined.—Univ. Pavia.

Hops.

327. NOTT, J.
New varieties of hops in the West Midlands.
Heref. agric. J., 1949, 11: 224-6.

About 30 varieties of Wye seedling hops have been under observation in the Teme Valley for some years. The characteristics of the 8 most promising of these are summarized.

328. KEYWORTH, W. G., AND PAINE, J.
Diseases of hops.
Heref. agric. J., 1949, 11: 165-95, illus.

The main diseases of the hop described include the virus diseases nettlehead, mosaic, split leaf blotch, and chlorotic disease, the suspected virus diseases leaf curl and fluffy tip, and the fungal diseases *Verticillium* wilt, *Phytophthora* root rot, *Armillaria* root rot and canker.—East Malling Research Station.

329. PRESTON, N. C.
Some other diseases of hops.
Heref. agric. J., 1949, 11: 197-203.

Notes on downy mildew [*Pseudoperonospora humuli*], powdery mildew [*Sphaerotheca humuli*], *Cladosporium* disease, and grey mould (*Botrytis cinerea*).

330. SALMON, E. S.
A note on the resistance of new [hop] varieties to diseases.
Heref. agric. J., 1949, 11: 203.

Distinct resistance to downy mildew is shown by certain new varieties of hop, e.g. Early Promise and Early Choice.

331. NEWTON, H. C. F.
Pests of hops.
Heref. agric. J., 1949, 11: 205-14, bibl. 6, illus.

Describes measures for the control of the hop damson aphid (*Phorodon humuli*), hop red spider (*Tetranychus telarius*), hop flea beetle (*Psylliodes attenuata*), hop strig maggot (*Contarinia humuli*), and the hop root weevil (*Epipolaeus (Plinthus) caliginosus*). A list of hop pests is added, giving their common and scientific names.

Herbs.

(See also 468.)

332. DRAIN, B. D., AND OTHERS.
A preliminary report on the yield and oil content of clonal strains of garden sage.
Proc. Amer. Soc. hort. Sci., 1949, 53: 371-4, bibl. 3.

The first steps to the selection of sage (*Salvia officinalis*) which can be grown economically in the U.S.A. Results indicate that oil content is influenced by both environmental and genetic factors.

333. WEBER, W. W.
Seed production in horseradish.
J. Hered., 1949, 40: 223-7, bibl. 5, illus.

The "common" variety of horseradish, to which nearly all the commercial acreage in America is planted, is very susceptible to white rust and mosaic virus; the Bohemian variety, however, is highly resistant to both these diseases but lacks quality. Both types are usually sterile. The production of fertile lines of horseradish through cross-pollination and selection would eliminate virus infection, stimulate improvement work and furnish material for a taxonomical study of the plant. In 1947 and 1948 a collection of clones of both types was flowered in a greenhouse at the University of Wisconsin. Two clones of the Bohemian variety matured some functional pollen, and one clone of the "common" variety produced ovaries with normal gametophytes. Cross-pollination was effected. Morphological, genetical and cytological observations are made on parents and progeny.

334. DIJKSTRA, S. P.
Veredeling van geneeskrachtige en aromatische gewassen. (Breeding medicinal and aromatic herbs.) [English summary 7 ll.]
Meded. Dir. Tuinb., 1949, 12: 482-9.

This paper deals with the significance of the chemical compounds contained in medicinal and aromatic herbs. Methods for breeding improved types depend upon the characters of the individual plants of the species.

335. ANDRÈ, E.
La moutarde junciforme dite "moutarde brune", *Brassica juncea* Czerny et Cosson. Plante oléagineuse, plante condimentaire, plante médicinale. (Chinese mustard, an oleaginous, condimental and medicinal plant.)
C.R. Acad. Agric. Fr., 1949, 35: 490-5.

an account of the distribution, nomenclature and uses of *Brassica juncea*.

Other crops of commercial interest.

36. BERKMAN, B.

Milkweed—a war strategic material and a potential industrial crop for sub-marginal lands in the United States.

Econ. Bot., 1949, 3: 223-39, bibl. 47, illus.

The industrial utilization of the products of milkweed, *Asclepias syriaca*, is discussed in the light of experience gained in the United States during the war. The principal products are floss from the seeds, which makes an excellent substitute for kapok, and bast fibre from the stems to serve as a source of cellulose. Oil can also be extracted from the seeds and wax from the pod shells. Although rubber is obtainable from the latex, this is now considered of minor importance. Investigations into the possibility of growing milkweed as an agricultural crop have been conducted in the United States, Canada and Russia, and the findings, together with the personal observations of the author, are summarized here, the requirements of the plant, cultivation of the crop and economics of production being dealt with.—Milkweed Floss Corporation of America, Chicago.

37. CLAASSEN, C. E.

Safflower production in the western part of the Northern Great Plains.

Circ. Neb. Exp. Stat. 87, 1949, pp. 23, bibl. 7.

Recommendations for cultivation are made based on experimental work in the Nebraska Panhandle in the last 7 years. Safflower is a cash crop grown for its seed. On land of average fertility with two or three irrigations yields of 1,750 to 2,750 lb. per acre should be obtained. Among points considered essential to its successful production are the following. Kill all weeds in seedbed by tilling a day or two before sowing. Sow clean seed treated with a mercuric dust. Sow at depth of 1 to 2 in. in moist soil. On dry land sow as for wheat. On irrigated land sow in rows 20 to 25 in. apart at 15 to 40 lb. per acre or, if solid drilled, at 40 to 60 lb. per acre. Harrow just before emergence to hinder weed growth. For best results in Nebraska harvest within a week to 10 days of maturity, i.e. during the latter part of September.

38. SIEVERS, A. F.

Goldenseal [*Hydrastis canadensis*] under cultivation.

Fmrs' Bull. U.S. Dep. Agric. 613, revised 1949, pp. 14, illus.

The range of this plant grown for the medicinal properties of its roots is from southern N. York and Ontario west to Minnesota and south to Georgia and Kentucky. The last figures for production were 15,144 lb. in 1939, its value \$40,464 and its area about 50 acres, more than half in the State of Washington. In commerce and culture it is closely associated with ginseng. Its cultivation needs some care and is here described. Propagation is by seed, division of rootstocks in the dormant period and by buds from the stronger fibrous roots. Under favourable conditions goldenseal reaches its best development for market in about 5 years from

the germination of seed. Botrytis is the most serious disease and in wet seasons may kill 10 to 20% of the tops, which, incidentally, are also highly attractive to slugs.

339. STOLOFF, L.

Irish moss—from an art to an industry.

Econ. Bot., 1949, 3: 428-35, illus.

The industrial utilization of carrageen moss (*Chondrus crispus*) in America was greatly stimulated by the war. New sources of raw material have been developed and old sources expanded. The main centres of harvesting are now at Scituate, Mass.; Rockland, Maine; Yarmouth, Nova Scotia, and Prince Edward Island. An account is given of the modern methods of harvesting, drying, bleaching and extraction of the moss, and of some of its uses.

340. BRADLEY, C. E., AND HAAGEN-SMIT, A. J.

The essential oil of *Pectis papposa*.

Econ. Bot., 1949, 3: 407-12, bibl. 9.

Pectis papposa, commonly known as chinchweed, is an essential oil producing plant native to the south-western states of America. A study of the yield and content of this essential oil showed that it is a potential commercial source of cumaldehyde and carvone, fragrant aldehydes now obtained from cumin, caraway and dill seed oils and used for food flavouring. Experimental crops in Arizona and California yielded up to 3 tons of green material per acre with an oil content of from 0.35 to 0.6%. The method of handling the green material prior to distillation considerably affected the yield.—California Institute of Technology.

341. ROSE, R. C.

Seaweed products.

Nat. Res. Coun. [Canada] Rev., 1949, being N.R.C. 1997, 1949, p. 79.

A note to the effect that work is being undertaken by the Division of Applied Biology to determine what factors determine quality and how quality can be maintained during harvesting and drying.

342. SHAW, H.

Possibilities for co-ordinated wattle research in the African region.

Commun. Afric. Reg. Sci. Conf. No. B(i)2, 1949, pp. 4.

While there is still room for development of the wattle industry within the Union of South Africa, greater scope lies in African territory outside the Union. This paper deals with the possibility of developing the industry and with the many relevant problems that need investigation. In this connexion an account is given of the work and aims of the Wattle Research Institute, recently established as a Department of the University of Natal, Pietermaritzburg.

Noted.

343.

a ANDERSON, P. J., AND SWANBACK, T. R. (WINDSOR TOBACCO SUBSTATION.)

Tobacco substation at Windsor. Report for 1945.

Bull. Conn. agric. Exp. Stat. 493, 1946, pp. 31 [received 1949].

- b BAKKEN, H. H.
The marketing and manufacturing of Wisconsin stemming tobacco.
Res. Bull. Wis. agric. Exp. Stat. **162**, 1949, pp. 16.
Mainly economic considerations.
- c BERRY, L. J., AND NORRIS, W. E., Jr.
Studies of onion root respiration. I. Velocity of oxygen consumption in different segments of root at different temperatures as a function of partial pressure of oxygen. II. The effect of temperature on the apparent diffusion coefficient in different segments of the root tip. [English, French and German summaries.]
Biochim. biophys. Acta, 1949, **3**: 593-606, bibl. 32, and 607-14, bibl. 13.
- d CAMERON, D. R.
Inheritance in *Nicotiana tabacum*. XXII. Investigations on multiple seedlings.
Amer. J. Bot., 1949, **36**: 526-9, bibl. 9.
- e CRANE, M. B., AND ZILVA, S. S.
The influence of some genetic and environmental factors on the concentration of L-ascorbic acid in the tomato fruit.
J. hort. Sci., 1949, **25**: 36-49, bibl. 15.
- f DAWE, T. C. R.
Cabbage culture in the Auckland district, *Bull. N.Z. Dep. Agric.* **330**, undated, pp. 8. illus.
- g FISCHER, M. A., AND LAUFFER, M. A.
The reaction of tobacco mosaic virus with formaldehyde. I. Electrophoretic studies.
Arch. Biochem., 1949, **23**: 291-6, bibl. 8.
- h FISHER, W. D., AND WILLIAMS, W. F.
Dry edible beans: situation in California, 1949.
Circ. Calif. agric. Exp. Stat. **394**, 1949, pp. 24.
- i GAGNEBIN, F.
Notes sur les graines potagères. (Notes on vegetable seed production.)
Rev. hort. suisse, 1949, **22**: 349-53, bibl. 4.
The principles to be observed.
- j JARRETT, J.
The hops certification scheme
Heref. agric. J., 1949, **11**: 215-16.
- k JOHNSON, J., AND OGDEN, W. B.
Tobacco fertilizer experiments in Dane County.
Res. Bull. Wis. agric. Exp. Stat. **149**, 1943, pp. 30 [received 1949].
- l JOHNSON, J., AND OGDEN, W. B.
Tobacco fertilizer experiments in Vernon County.
Res. Bull. Wis. agric. Exp. Stat. **148**, 1943, pp. 31 [received 1949].
- m KRAMER, A., AND OTHERS.
Objective methods for measuring quality factors of raw, canned, and frozen asparagus.
Proc. Amer. Soc. hort. Sci., 1949, **53**: 411-25.
Quality being judged by colour, flavour and freedom from fibre.
- n KRONE, B. P.
Winter ripening of green tomatoes.
J. Dep. Agric. Vict., 1949, **47**: 271-3, illus.
- o MINISTRY OF AGRICULTURE, LONDON.
Recommended grades for lettuces produced in England and Wales (for trial use in 1949-50).
Market. Leaflet. Minist. Agric. Lond. **106**, 1949, pp. 4, 2d.
- p MINISTRY OF AGRICULTURE, LONDON.
Recommended grades for tomatoes produced in England and Wales (for trial use in 1949-50).
Market. Leaflet. Minist. Agric. Lond. **105**, 1949, pp. 4, 2d.
- q MINISTRY OF AGRICULTURE, LONDON.
White rot of onions and related crops [*Sclerotium cepivorum*].
Adv. Leaflet. Minist. Agric. Lond. **62**, 1949, pp. 4.
- r MINISTRY OF AGRICULTURE, LONDON.
Spring cabbage.
Winter cabbage and savoy.
Summer and autumn cabbage.
N.A.A.S. Adv. Leaflets. **349**, **350** and **351**, 1949, bibl. in texts, pp. 3 each.
- s NILSSON, F., AND LARSSON, G.
Sortförsök med köksväxter i Norrland. V. Rödbetor och morötter 1945-1948. (Vegetable variety trials in northern Sweden V. Garden beets and carrots 1945-48.) [English summary 1 p.]
Medd. Trädgårdsförs. Malmö **55**, 1949, pp. 173-214, bibl. 4.
- t ODLAND, M. L.
Interrelation of spacing, variety and interplanting on yield and fruit size of tomatoes.
Proc. Amer. Soc. hort. Sci., 1949, **53**: 393-401, bibl. 4.
- u WILCOX, W. W., AND BOWDITCH, J. B.
Economic aspects of canning peas.
Res. Bull. Wis. agric. Exp. Stat. **158**, 1945, pp. 19 [received 1949].
- v WILKINSON, E. H.
Intensive methods of hop propagation.
Heref. agric. J., 1949, **11**: 217-23, illus.
By layering and by soft-wood cuttings.
- w YOUNG, R. E.
The effect of maturity and storage on germination of Butternut squash seed.
Proc. Amer. Soc. hort. Sci., 1949, **53**: 345-6.
Maturity essential, storage useful.
- x ZIMMERMAN, J. F., AND BERRY, L. J.
Studies of onion root respiration III. Ampereometric titration as a method for the measurement of respiratory overshoot. [English, French and German summaries.]
Biochim. biophys. Acta, 1949, **3**: 615-24, bibl. 26.

FLORICULTURE.

General.

(See also 1, 7, 8, 19-23, 38, 39, 45-47, 48i, 144, 229-231, 470.)

344. VAN STUIVENBERG, J. H. M.

De mogelijkheid van verlenging van de levensduur van snijbloemen speciaal met het oog op het vervoer over grote afstand. (The possibilities of increasing the life of cut flowers.) [English summary $\frac{1}{2}$ p.] *Meded. Dir. Tuinb.*, 1949, 12: 717-34, bibl. 3, illus.

The possibilities of increasing the life of cut flowers during transport by using airtight containers, boxes or packaging film are discussed. Flowers should be cooled during or immediately before transport. With precooling it will generally be necessary first to wrap the flowers in insulating material. Packing is either only vapour-tight (for tulips) or also gas-tight (for roses, carnations, pyrethrums, narcissi, freesias, sweet peas, larkspurs). Gas-tight packings with increased CO₂ content are mentioned. It is shown how accelerated flowering may be induced by growth-promoting substances. Suggestions are made for applying gas packing to sea or air transport over long distances.

345. PEARSON, H. E.

Effect of waters of different quality on some ornamental plants.

Proc. Amer. Soc. hort. Sci., 1949, 53: 532-42, bibl. 11.

Suggestions based on experiments in Southern California are made for the control of salinity and alkalinity in pot plants.

346. CHADWICK, L. C.

The effect of certain mediums and watering methods on the rooting of cuttings of some deciduous and evergreen plants.

Proc. Amer. Soc. hort. Sci., 1949, 53: 555-66, bibl. 3.

Results are detailed of the use of different media and watering systems applied to cuttings of a large number of plants including lilac, *Euonymus* spp., cotoneaster, *Pachistima canbyi*, *Pieris japonica*, rhododendrons, *Viburnum*, *Ilex opaca*. No. 7 silica sand and Vermiculite 1 proved particularly valuable.

347. PRITCHARD, A. E., AND BEER, R. E.

Parathion for control of pests of ornamental and flowering plants.

J. econ. Ent., 1949, 42: 372-9, bibl. 5.

Extensive experimental work with commercial crops of ornamental and other flowering plants have shown that parathion sprays are very effective for the control of the cyclamen mite, spider mites, thrips, aphids, white-flies, mealybugs, armoured scales, lepidopterous insects and certain stages of soft scales when occurring under relatively exposed conditions. The sprays were ineffective against false spider mites and many mites and insects which were protected by plant tissue. Plants of a very wide variety were found to be tolerant to insecticidal concentrations of the parathion wettable powder which was furnished for experimental purposes. Ferns, poinsettias, and African violet blossoms were

the most sensitive to injury. Roses, gardenias, and stephanotis have often suffered leaf drop as a result of applications of several different commercial spray materials or liquefied-gas aerosols by growers. [From authors' summary.]—Univ. California, Berkeley.

348. BEACH, G.

Some effects of sodium selenate on greenhouse carnations grown in gravel.

Proc. Amer. Soc. hort. Sci., 1949, 53: 507-12.

Whereas sodium selenate gave good protection against red spider in gravel-cultured carnations, plant growth became more stunted as the Se/S ratio became narrower. Work continues in search of the optimum.

349. KIPLINGER, D. C., AND HASEK, R.

Spring flowering chrysanthemums.

Proc. Amer. Soc. hort. Sci., 1949, 53: 437-9, bibl. 5.

By light and temperature manipulation at Wooster, Ohio, it was found possible to induce spring flowering from early April to early June in pompom chrysanthemums. The different dates at which cuttings should be set, extra lighting started [and the amount and duration], pinching carried out, lighting discontinued and—for those expected to flower in June—shade provided, are here set out.

350. WILSON, R. G.

The various food needs of chrysanthemums, snapdragons.

Flor. Exch., 1949, 113: 19: 56, 58-9.

Some results are reported of experiments made at the Ontario Agricultural Experiment Station on the nutrient requirements of tomatoes, chrysanthemums and snapdragons, and the concentration and balance of nutrients needed during different seasons and stages of growth. Water culture methods were used.

351. OLSON, C. J.

Possibilities of 100% stunt-free stock.

Flor. Exch., 1949, 113: 20: 19, 32-3.

If certain precautions are taken in stock building and propagating, the author believes it is quite possible to obtain a stunt-free stock of chrysanthemums. He here describes the procedure used by Yoder Brothers Inc., Barberton, Ohio, for building up healthy stock, and checking and indexing it.

352. BAKER, K. F., DIMOCK, A. W., AND DAVIS, L. H.

Life history and control of the ascochyta ray blight of chrysanthemum.

Phytopathology, 1949, 39: 789-805, bibl. 21, illus.

The symptoms of ray blight of chrysanthemum and the causal organism, *Ascochyta chrysanthemi*, are described. The perfect stage of the fungus is here described under the name *Mycosphaerella ligulicola* sp. nov. A Parzate spray ($\frac{3}{4}$ lb. per 100 gal., plus a good spreader) applied on a 7-day schedule gave good control under field conditions.—University of California and Cornell University.

353. DAVIDSON, O. W.

Effects of ethylene on orchid flowers.

Proc. Amer. Soc. hort. Sci., 1949, 53: 440-6, bibl. 3.

Cattleya flower buds that are starting to open as indicated by the sepals beginning to split apart from each other, are sensitive to extremely dilute concentrations of ethylene. The sepals of flowers in this stage of development are injured in a characteristic manner by exposure to as little as 0.002 p.p.m. ethylene for 24 hours, or 0.1 p.p.m. for 8 hours.

Bulbs, tubers, etc.

354. VICKERY, H. B., AND OTHERS.

Chemical investigation of the metabolism of plants. I. The nitrogen nutrition of *Narcissus poeticus*.

Bull. Conn. agric. Exp. Stat. **496**, 1946, pp. 93, bibl. 52 [received 1949].

Groups of bulbs of *N. poeticus* were grown under nutrient conditions of water only, a complete culture solution containing nitrate, and a complete culture solution containing ammonium salts. Duplicate sets were kept in complete darkness and continuous light. The effects of the different treatment on the metabolism of the plants were noted and are compared with those obtained in similar trials on *Polyanthus narcissus* by Nightingale and Robbins and with results of work on rhubarb and other plants.

355. STRUIJS, L. C.

Bemestingsresultaten en -problemen bij de voornaamste bolgewassen. (Results and problems connected with manuring the principal bulbous crops.) [English summary 9 ll.]

Meded. Dir. Tuinb., 1949, **12**: 616-32, bibl. 6, illus.

The properties of specific dune sand soils in relation to their suitability for bulb growth are mentioned. Trials involving gradually increasing applications of nitrogen, phosphate and potash to tulips, narcissi and gladioli showed that the application of N and P had a favourable effect on the yield but that overdoses depressed production. The potash problem is discussed in relation to leaching. The effect of soil type and manuring on the growth of bulbs is reviewed.

356. STUART, N. W.

Fertilizers for gladiolus.

Flor. Exch., 1949, **113**: 11: 19.

Greenhouse and field tests at Beltsville have shown that the nutrient requirements of flowering size gladiolus corms are low, and that any soil of moderate fertility can be used to produce quality flowers from No. 3 or larger size corms without fertilizers. Best results have been obtained from corms fertilized only at flowering time and 2 weeks later during the previous season's growth, when the new corm is forming. Fertilizers applied in the row before planting delayed flowering and decreased flower and corm yields.

357. STUART, N. W.

Causes and control of Croft lily leaf burning.

Flor. Exch., 1949, **113**: 11: 15, 53, illus.

During the past 2 years many cases of spotting of Croft Easter lily leaves during forcing have been reported in the United States. Symptoms appear about half way up the plant when flower buds are first visible, or later, and the spots regularly occur on the margins of leaves

an inch or two from the tip. In fertilizer experiments at Beltsville the following results were obtained. The addition of nitrogen alone reduced burning, while the inclusion of phosphorus and potassium in the mixture overcame the beneficial effects of nitrogen. Nitrogen in combination with boron and magnesium also reduced burning, although the use of these trace elements alone did not. Moreover, plants syringed daily with water had fewer burned leaves than plants not syringed, a fact suggesting that water relations as well as nutrition are concerned in this problem. These preliminary results, together with magnesium analyses of the experimental plants, indicate that the leaf burn is due to magnesium-deficiency. To reduce burning, growers are recommended to apply nitrogen and to prevent the plants from drying out during forcing.—Bureau of Plant Industry, Soils, and Agricultural Engineering, U.S.D.A., Beltsville.

358. GOULD, C. J., AND MILLER, V. L.

A cheaper and safer treatment for basal rot of narcissus.

Flor. Exch., 1949, **113**: 20: 16, 55.

Phenyl mercuric acetate (PMA) has proved to be much safer than 2% Ceresan for treatment of narcissus bulbs to control basal rot. Bulbs treated at a concentration of 1 lb. per 800 gal. of water gave more, larger and earlier flowers than untreated bulbs. The low cost of this material makes it economically practicable to treat bulbs in flats in large tanks. Control, however, is no better than that given by 2% Ceresan. Detailed directions are given for its use.

359. HAIGHT, G. S.

The use of sodium selenate as a control for cyclamen mite, *Tarsonemus pallidus* Banks.

Proc. Amer. Soc. hort. Sci., 1949, **53**: 520-4, bibl. 1.

Na_2SeO_4 0.75 g./gal. proved a more satisfactory control of cyclamen mite [on cyclamen] than a proprietary substance P-40. It was, however, not 100% efficacious and higher concentrations damaged the plant.

360. HASTINGS, R. J.

Concerning the movement of the bulb eelworm, *Ditylenchus dipsaci* (Kuhn) Filipjev, in narcissus bulbs.

Sci. Agric., 1949, **29**: 354-5, bibl. 3.

An examination of a consignment of English bulbs supported the theory that the spread of infection of bulb eelworm from scale to scale takes place by way of the basal plate, and that the infected scales turn brown. Discoloration, however, was only found in the basal quarter of the scales, where the eelworm population was more dense than in the uncoloured portions. There appeared to be a connexion between the age of infection and the extent of discoloration. In a consignment of British Columbian bulbs, however, scales were often found to be infected from the base to the apex with no sign of discoloration. There are indications that the eelworm moved more rapidly through the British Columbian bulbs than through the English bulbs, and this may account for the lack of discoloration.—Dom. Lab. Plant Path., Saanichton, B.C.

361. ENTOMOLOGICAL BRANCH, DEPARTMENT OF AGRICULTURE, N.S.W.

The gladiolus thrips (Taeniothrips simplex).

Agric. Gaz. N.S.W., 1949, 60: 297-300, illus.

The gladiolus thrips is a widespread and serious pest in New South Wales. Control measures: (1) Pull up and destroy volunteer plants some time before the main crop is planted. (2) The frequent use of overhead sprinklers or thorough hosing of the plants will retard the development of the thrips. (3) Corms should be stored in flaked naphthalene in bags, for 3 weeks before they shoot. (4) DDT cover sprays and foliage poison sprays containing Paris green are highly toxic to thrips.

362. LAFLEUR, W.

Caladiums the year 'round.

Flor. Exch., 1949, 113: 19: 21, 61.

Tests were conducted at the Ohio State University to determine methods by which caladiums could be forced in the greenhouse during all seasons of the year. The following results are reported. (1) *Dormancy breaking.* Rhizomes of Cleo and Crimson Wave caladiums treated with 0.2% ethylene chlorohydrin before planting sent up shoots 11 and 21 days respectively in advance of untreated rhizomes. Rhizomes of the Cleo variety treated with 2,4-D at 5 and 10 p.p.m. were forwarded by 20 days; Crimson Wave, however, did not respond to 2,4-D treatment. (2) *Dormancy lengthening.* Treatment with 2,4-D at 5,000, 10,000 and 20,000 p.p.m. resulted in early death of the rhizomes. The methyl ester of naphthaleneacetic acid, however, used as a 2-2% dust, gave good results. Rhizomes dusted with this material and stored in bags were still dormant after 5 months. Subsequent growth was satisfactory. *General culture.* Experiments were also conducted to determine the most suitable temperature and medium for starting rhizomes into growth, the effect of pH and various soil mixtures on the plant growth, and the most favourable level of nutrition.

Roses.

363. ANDERSON, W. L., AND EDMISTER, F. C.
Multiflora rose—for living fences and wild-life cover.

Leaflet. U.S. Dep. Agric. 256, 1949, pp. 8, illus.

For its permanence, ease of establishment, soil conservation and decorative value, a hedge of multiflora rose is recommended to the American farmer. Suggestions are made for its use, establishment and maintenance.

364. ALEKSEVA, E. I.

The anatomical structure of softwood cuttings of Rosa gallica L. during root development. [Russian.]

Doklady Akad. Nauk S.S.S.R., 1949, 67: 565-8.

The chief anatomical difference between softwood cuttings treated with heteroauxin and controls was that the former developed 25-30 root initials, the latter 8-10. 98% of the cuttings treated for 12 hours with 0.01% heteroauxin rooted, but only 54% of the untreated.

365. LAURIE, A., AND STILLINGS, E.

Studies on propagation of greenhouse roses by cuttings.

Proc. Amer. Soc. hort. Sci., 1949, 53: 492-500.

Trials at Wooster, Ohio, led to the following conclusions:—Bottom heat—a bottom heat of 70° F. is generally best. Growth substances—the effect of growth substances may vary with previous treatment of stock plants. Media—number 7 silica sand and No. 1 vermiculite best. Wounding—wounding the basal end was slightly advantageous. Air temperature—with a bottom heat of 70° F. an air temperature of 50° gave higher rooting percentages than 60° or 70° F. Watering—sub-irrigation was preferable to overhead watering. Age of tissue—lower parts of cane were not always successful. Place and type of cut—appeared to be unimportant. Other factors considered included humidity and precooling, the optima for these varying with different varieties.

366. SEELEY, J. G.

The response of greenhouse roses to various oxygen concentrations in the substratum.

Proc. Amer. Soc. hort. Sci., 1949, 53: 451-65, bibl. 45.

In these trials in culture solutions and soil at Ithaca, N.Y., the greatest root and shoot development occurred when the cultures were aerated with 10% and 21% oxygen. In nutrient solutions aeration with 21% oxygen was more successful than that with 10%, but in soil the results were significantly the same. Plants in soil aerated with 5% oxygen grew fairly well though slightly inhibited in shoot growth, but with only 1% oxygen aeration gave little shoot growth and showed leaf chlorosis. In solutions with 1% or 5% oxygen aeration plants grew badly and showed chlorosis.

367. CHADWICK, L. C.

Some results with the use of opaque structures for propagation by cuttings.

Proc. Amer. Soc. hort. Sci., 1949, 53: 567-72, bibl. 3.

Experiments were conducted at Columbus, Ohio, to determine the possibility of using opaque structures with fluorescent lights and with control of atmospheric conditions for propagation by cuttings of roses and other ornamental shrubs. Results were not so good as those obtained in an ordinary lean-to glasshouse. The main problems appear to be the supply of sufficient light intensity and an even intensity to all parts of the rooting bench.

368. SHANKS, J. B., AND LAURIE, A.

A progress report of some rose root studies.

Proc. Amer. Soc. hort. Sci., 1949, 53: 473-88, bibl. 20.

Experiments in gravel culture and in soil were made on the phases of (1) concentrations of oxygen and CO₂ for root aeration, (2) temperature of soil, and (3) moisture content of soil and their effects on root and top growth. Results are outlined but not discussed and a further report is promised.

369. KAMP, J. R.

Effect of partial defoliation on flower production of Better Times roses.

Proc. Amer. Soc. hort. Sci., 1949, 53: 449-50.

Although defoliated plants produce about twice as many shoots as undefoliated, many of these are blind and the total number of flowers is less. The practice of defoliation is not recommended.—Urbana, Ill.

370. ALEKSEEVA, E. I.

A rose yielding essential oil. [Russian.]

Sad i Ogorod (Orchard and garden), 1949, No. 9, pp. 61-3, illus.

A selection of *Rosa gallica* is described as a frost-resistant variety which is a rich source of attar of roses. It is propagated vegetatively by division, by layering and by cuttings. Rooting the cuttings is improved by the application of 0.005% indolylbutyric acid.

Shrubs.

371. STRUCKMEYER, B. E., AND ROBERTS, R. H.

The initiation of natural breaks in azalea.

Proc. Amer. Soc. hort. Sci., 1949, 53: 431-6.

Azalea plants can be conditioned for breaking by growing them in a cool temperature of 50° F. for 5 to 6 weeks during November and December. In this period the axillary buds become sufficiently large to produce breaks when a warmer growing temperature is provided. [Authors' summary.]

372. VAN RAALTE, A.

Iets over de geschiedenis en cultuur van de sering. (The history and culture of lilac.)

Cult. Hand., 1949, 15: 495-500, 549-52.

This article on the lilac and its cultivation includes notes on its particular culture, raising seedlings and grafting them, the treatment of the grafted plants, forcing, treatment of frozen bushes, treatment after forcing, pruning, manuring and varieties.

373. HAARER, A. E.

Bamboo growing in England.

Fruitgrower, 1949, 108: 799-800, illus.

An informative article on the requirements, establishment and cultivation of a bamboo "brake". Although the plants take longer to grow and are smaller in stature in England than in their natural habitat, it is considered that bamboos can be grown commercially in the west country and southern England with a fair chance of success. Shelter from north and east winds is the most important provision. Once the plants are established little weeding or cultivation is necessary, and the only expense incurred is for dressings of fertilizer. Varieties, recommended by W. J. Bean for planting "where success is problematical", are listed and described.

Noted.

374.

a BOKE, N. H.

Development of the stamens and carpels in *Vinca rosea* L.

Amer. J. Bot., 1949, 36: 535-47, bibl. 40, illus.

b FISCHER, C. W., JR., AND KOFRANEK, A. M. Bottom break production of rose plants as influenced by plot location in the greenhouse. *Proc. Amer. Soc. hort. Sci.*, 1949, 53: 501-2. No significant differences observed.

c KAMP, J. R.

Factors influencing flower production and bud-drop in gardenias.

Proc. Amer. Soc. hort. Sci., 1949, 53: 447-8, bibl. 3.

Results of trial not very definite.

d KAPPERT, H.

Die Genetik des *incana*-Charakters und der Anthozyanbildung bei der Levkoje. (The genetics of the *incana* character and of the anthocyanin formation in stocks.) *Züchter*, 1949, 19: 289-97, bibl. 5.

e KOFRANEK, A. M., AND FISCHER, C. W., JR.

Bottom break production of rose plants as influenced by methods of watering and by soil texture.

Proc. Amer. Soc. hort. Sci., 1949, 53: 503-6. No significant differences observed.

f LAURIE, A., HASEK, R. F., AND LAFLEUR, W.

The effect of various concentrations of fluorine gas on gladiolus.

Proc. Amer. Soc. hort. Sci., 1949, 53: 466-72, bibl. 1.

g MOORE, R. J.

Cytotaxonomic studies in the Loganiaceae. III. Artificial hybrids in the genus *Buddleja* L.

Amer. J. Bot., 1949, 36: 511-16, bibl. 9, illus.

h OUBOTER, M. P. DE B., AND VAN SLOGTEREN, E.

Het Augusta-ziekte der tulpen, een virus-ziekte van het tabaks-necrosetype. (The Augusta disease of tulips, a virus disease of the tobacco-necrosis type.) [English summary 12 ll.]

Tijdsch. PZiekt., 1949, 55: 262-71, bibl. 3, illus.

i PFAHL, P. B., ORR, H. P., AND LAURIE, A.

The effect of warm water applications to greenhouse roses.

Proc. Amer. Soc. hort. Sci., 1949, 53: 489-91. Not found economical at Wooster, Ohio.

j SWINGEN, J. L., BRYANT, W. G., AND LAURIE, A.

Marketing of prepackaged flowers.

Proc. Amer. Soc. hort. Sci., 1949, 53: 525-31.

k ZIMMERMAN, P. W., AND HITCHCOCK, A. E.

Formative effects of several substituted phenoxy acids applied to *Kalanchoe*.

Contr. Boyce Thompson Inst., 1949, 15: 421-7, bibl. 6, illus.

SUB-TROPICAL CROPS.

(See also 481.)

Citrus.

375. MARLOTH, R. H.

Citrus growth studies. 1. Periodicity of root-growth and top-growth in nursery seedlings and budlings.*J. hort. Sci.*, 1949, 25: 50-9, bibl. 6.

This paper reports root-growth and top-growth observations made in 1937-40 at Nelspruit, E. Transvaal, on rough lemon and sweet orange seedlings, on Valencia budlings on these stocks, and on their subsequent shooting after being planted out under conditions of summer rainfall and mild winter in a sub-tropical climate. The general trend of root-growth and top-growth behaviour was the same for seedlings and budlings and also for rough lemon and sweet orange as seedlings or as stocks for budlings. Seedlings exhibited a greater degree of activity in both root-growth and top-growth than did budlings, and rough lemon a greater degree than sweet orange, either as a seedling or budling stock. The periodicity of root-growth in citrus was confirmed. Two major periods and three minor periods were recorded; the longer major period is during the winter, with a second major period in mid-summer. Although distinct cycles for major top-growth, or flushes, were exhibited, periodicity of top-growth in young seedlings and budlings was very variable. Four periods of top-growth were recorded, the major ones being consecutive, one in spring and the other in mid-summer. The trend, in general, towards alternation in periodicity of root-growth and top-growth existed. On transplanting, seedlings established themselves more easily than did budlings, and rough lemon budlings much more easily than did budlings on sweet orange. While in colder climates, the main factor limiting citrus root-growth, either directly or indirectly, is accepted to be soil temperature, no specific correlation between soil temperatures above 57° F. and periodicity of root-growth was found with young plants. Top-growth did not show any definite correlation with soil or atmospheric temperatures. It is suggested that the control of periodicity of root-growth and top-growth is determined by an internal factor such as hormonal production and communication, or by the influence of ecological factors thereon, rather than by a direct effect on the growing points themselves. Among the practical applications of this work discussed are the most favourable times for nurserymen and growers to plant nurseries and orchards in order to obtain best subsequent growth, the factors which cause losses on such planting-out, and the necessity for winter irrigation in summer rainfall areas. [From author's summary.]

376. JAMISON, V. C.

Resistance to wetting in the surface of sandy soils under citrus trees in Central Florida and its effect upon penetration and the efficiency of irrigation.

Proc. Soil Sci. Soc. Amer. 1946, 1947, 11: 103-9, bibl. 4 [received 1949].

As citrus groves on sandy soils in central Florida get older, the surface soil beneath the trees develops a resistance to wetting which not only limits moisture

penetration in healthy groves and makes irrigation inefficient, but appears to be related to the "spreading decline" of citrus. The condition is confined mostly to the soil beneath the trees in the 1-8 inch depth, and is a property of the organic matter. This paper reports the progress made in finding the best methods of destroying this water-resistant condition and preventing reversion. Tilling the soil under the trees to a depth of 3 inches several times prior to the summer rainy season of 1946 markedly improved the uniformity of wetting. Rough hoeing of the surface so as to leave drainage cups also improved wetting. Laboratory tests showed that mixing wettable aluminosilicate and phosphatic clays with the upper inch of the surface, followed later by alternate irrigation and cultivation to about 3 inches, should improve wetting. Wetting agents appear to have a similar application. Equipment suitable for cultivating beneath the trees without excessive pruning of the branches has yet to be devised. A survey taken in 1946 in central Florida shows that the "spreading decline" condition of citrus groves is related to extreme resistance to wetting in the soil. It is unknown whether this soil condition is a causal factor or the result of the disease. It is shown that interception of rainfall by the tree cannot be the most important factor in the development of resistance, and the suggestion is made that residues of root or leaf decay or exudates might possibly be responsible.—Citrus Exp. Stat., Lake Alfred, Fla.

377. WALLACE, J. M.

Inoculation technique, incubation period, and early symptoms of the quick decline disease of citrus.

Abstr. in Phytopathology, 1949, 39: 863-4.

The destruction of phloem tissues of trees of sweet orange on sour orange rootstocks affected by quick decline induced a girdling effect. Trees 1 to 2 years old usually show no marked top symptoms until 12 to 15 months after infection. Young trees inoculated in early September and cut back very severely produced a flush of new leaves and then went into winter dormancy; the following January they showed small, off-colour leaves, an absence of stored starch in roots, and slight rotting of feeder roots.

378. TUCUMÁN, ESTACIÓN EXPERIMENTAL AGRÍCOLA.

"Podredumbre de la raicilla" o "tristeza" de los citrus. Conclusiones arribadas por la comisión de técnicos citricolas. (Root rot or "tristeza" of citrus. Conclusions arrived at by the commission of citrus experts. *Circ. Est. Exp. Agric. Tucumán* 143, 1949, pp. 6.

A report of the findings and recommendations of the commission set up at the instigation of the Agricultural Experiment Station, Tucumán, to investigate the possibility of controlling the spread of "tristeza" disease of citrus in the north-western provinces of Argentina. The disease is causing serious damage in the provinces of Salta and Jujuy, but in Tucumán and Santiago del Estero only isolated cases have so far been

observed. The following measures are proposed to prevent its spread. (1) Introduction of citrus plants or parts of plants (excepting seeds and fruits) from other areas should be prohibited. Movement of plants within the area should be strictly controlled. (2) Eradication of infected or suspected plants. (3) The best cultural practices in healthy orchards should be encouraged to maintain them in vigorous condition. (4) Efficient control of vectors (aphis). (5) Approach grafting should not be used. (6) The use of sour orange and its varieties as rootstocks should be restricted to certain varieties of lemon, to be specified in due course. Alternative resistant rootstocks are discussed in the light of experience gained in the coast provinces of Argentina and other countries. *Sweet orange* is very susceptible to gummosis and is therefore only recommended for plantations on high ground and deep, permeable soils. *Poncirus trifoliata* behaves unreliably in North-west conditions, and requires methods of propagation that are unfamiliar in that district, so should be used only on expert advice. *Rangpur Mandarin* is relatively short-lived but comes into bearing early. It is well adapted to heavy soils and the crop ripens early. "*Cleopatra*" and "*Oneco*" Mandarins are reasonably resistant to gummosis, adapted to various types of soil and recommended in the present situation. *Rough lemon* is very vigorous, early and productive. It prefers open soils and is not frost resistant. It combines best with late oranges and grapefruit. *Grapefruit* is not recommended, as it is susceptible to "tristeza". *Persian Lime* and *Sutil Lemon* are susceptible to other serious diseases. Measures should be taken to obtain seed of these stocks as soon as possible. The production of new stocks will be in the hands of official or specially trained nurserymen.

379. TRIFOLIATA IMPROVEMENT COMMITTEE, N.S.W.
Scaly butt of Trifoliata. Need for certified buds for all citrus on this stock
Agric. Gaz. N.S.W., 1949, 60: 475.

It is recommended that all buds for use on Trifoliata stock should be taken from trees of known performance on that stock, whether they be Valencia, Washington Navel, grapefruit or mandarin. Lemons are still not recommended for use on Trifoliata.

380. BAILEY, F. L.
The culture of Meyer lemon trees
N.Z. J. Agric., 1949, 79: 245-52, bibl. 3, illus.

The Meyer lemon is a sweet orange-lemon hybrid that comes into early fruiting and, for its size, bears a profuse crop of useful attractive fruit. Its culture and harvesting in New Zealand are described under selection of site, shelter, drainage, stocks, preparation of soil, planting, cultivation, harvesting, grading, packing, and diseases. Island sweet orange rootstocks can be recommended for Meyer lemons, as several healthy blocks of trees which have been worked on them are growing in the citrus-producing areas of North Island.

381. KALIČAVA, A. D.
Growing lemons in tubs [Russian.]
Sad i Ogorod (Orchard and garden), 1949,
 No. 9, pp. 33-6, illus.

As frost-resistant lemons have not yet been produced, it is suggested that in certain parts of Russia lemons

should be grown in tubs, and advice is given on their cultivation under such conditions based on trials carried out at the former Soviet humid subtropics research station. Grafted or own-rooted plants are suitable, the latter being preferred for the northerly regions of Russia where lemons are mostly grown indoors. The young plants are grown in pots until they are 4 or 5 years old and then transplanted to the tubs. The precautions to be taken at potting and transplanting are set out, with emphasis on supplying sufficient water without stagnation and on source of the water applied. Rain-water is recommended, while well-water is to be avoided. The temperature of the water must be about that of the air, or preferably a little higher. Hints are given on manuring, and on times of transplanting.

382. MIRIMANJAN, V. A.
The physiological effect of α -naphthalene-acetic acid on lemon plants. [Russian.]
Doklady Akad. Nauk S.S.S.R., 1949, 66:
 737-40, bibl. 11.

Data presented show that spraying lemon plants with a 0.1% water solution of α -naphthaleneacetic acid and 0.5% agar-agar increased photosynthesis and catalase activity but reduced vitamin C content.

383. CALAVAN, E. C.
Lemon tree collapse.
 Abstr. in *Phytopathology*, 1949, 39: 858-9.

Lemon tree collapse in S. California follows a prolonged period of starvation of the rootstock and generally occurs between 15 December and 1 June. External symptoms are a twisting leaf roll followed by a slight to extreme wilt, excessive fruiting, small and prematurely coloured fruit, lack of growth, sloughing of bark from rootlets and, frequently, yellowing of the foliage and partial defoliation. Transmission tests by budding have produced no positive reaction in 13 months. The Eureka variety appears most susceptible.

384. BAINES, R. C., AND OTHERS.
Hot-water treatment of orange trees for eradication of the citrus root nematode and *Phytophthora citrophthora*.
 Abstr. in *Phytopathology*, 1949, 39: 858.

The citrus-root nematode, *Tylenchulus semipenetrans* Cobb, was eradicated from the roots of young, bare-root, sour orange trees by submerging the roots in water at 113°, 116° or 119° F. for 25, 10 and 5 minutes respectively. Heating the soil and roots of balled orange trees at 102°-105° F. for 20 hours in moist air eradicated the citrus-root nematode and *Phytophthora citrophthora* infections.

385. KLOTZ, L. J., AND DE WOLFE, T. A.
Limitations of the hot-water treatment for the control of brown rot of lemons.
 Abstr. in *Phytopathology*, 1949, 39: 860.

For adequate control of brown rot of lemons in the packing house an immersion of 4 or more minutes in water at 118°-120° F. is necessary. To avoid rind oil injury, cold, turgid lemons should be wilted slightly before immersion in hot solution.

386. HUGHES, W. A., AND LISTER, C. A.
Lime disease in the Gold Coast.
Nature, 1949, 164: 880, bibl. 2.

The seedling lime disease which threatens to destroy the industry in the Cape Coast district of the Gold Coast Colony is caused by two strains of a virus, the symptoms of which are described as (1) a one-sided death of the tree coupled with veinal fleckings on the young leaves and severe pitting of the trunks and branches; (2) conspicuous dwarfing together with the usual veinal symptoms and subsequent death. Since it has been found that limes budded on rough lemon do well where seedling limes fail, the rehabilitation of the industry is being carried out on these lines, while a search for resistant trees is being made. *Aphis taveresi* was shown by the authors to be the vector.

387. FRÉZAL, P.

Résultats d'observations et d'essais concernant la mouche de l'orange. (The Mediterranean fruit fly.)

C.R. Acad. Agric. Fr., 1949, 35: 463-7.

The host plants of the Mediterranean fruit fly (*Ceratitis capitata*) are enumerated and the results of trials for its control are tabulated. DDT, HCH, chlordan and SNP are all effective, the effect of DDT being the most lasting.

Avocado.

388. GROSZMANN, H. M.

Selecting avocado varieties [for Queensland].

Qd agric. J., 1949, 68: 271-2.

The varieties Fuerte and Nabal, which are briefly described, are recommended for "the bulk of all plantings in the near future". Unprofitable seedling trees should be worked over to one or other of these two varieties. A small proportion (1:8) of a third variety, Anaheim, may be included in new plantings.

Sweet potato.

389. CALMA, V. C., AND ZAMORA, F. S.

The yield and varietal characters of some varieties of the sweet potato.

Philipp. Agric., 1949, 32: 215-22, bibl. 5.

Leaf and tuber characters are described for 11 varieties of sweet potato. In a field trial, plots were harvested at intervals of 15 days from the 50th to the 185th day after planting. Nine varieties produced their heaviest yields on the 95th day, one known as Tamisang Puti yielding significantly more than any of the others. Two varieties matured in 65 to 80 days and one gave its highest yield in 110 days, but their yields were below those of Tamisang Puti harvested on the same days. A few varieties still had marketable roots up to 185 days, but the majority had rotted. Weevil infestation increased greatly, though with some varietal variation, from the time that the tubers reached maturity.

G.K.A.

390. LE RICHE, F. J. H.

Studies on the processing of vegetables. Part V. Ascorbic acid and carotene values of some sweet potato, pumpkin, and paprika varieties.

Sci. Bull. Dep. Agric. S. Afr. 263, 1946, pp. 5, bibl. 4 [received 1949].

Analyses made at the Western Province Fruit Research Station, Stellenbosch, showed that there is a direct

relationship between colour and carotene content of the sweet potato, varieties having a blotchy pink or yellow colour being much richer in carotene than the pure white. There is no relationship between the ascorbic acid and carotene content, but the varieties 85986, Dessert, Nancy Hall, 104120, Meyers Early, Manneyita, Red Brazil, Southern Cross and Puerto Rico are rich in both. In general sweet potatoes have a high vitamin C value, while carotene values vary. Pumpkins are relatively high in carotene and low in vitamin C, and, as in sweet potato, the colour of the flesh is associated with carotene content. Paprika and kale are outstandingly rich in ascorbic acid.

391. LEONARD, O. A., ANDERSON, W. S., AND GIEGER, M.

Field studies on the mineral nutrition of the sweetpotato.

Proc. Amer. Soc. hort. Sci., 1949, 53: 387-92.

In trials with Unit 1 Porto Rico, sweet potatoes at Poplarville, Miss., were grown in sandy loam soil and were supplied with varying amounts of nitrogen, phosphorus, potassium, calcium and magnesium. The available N and K supplied were found to be related to the N and K content of the leaf blades and yield of roots. Plants with leaf blades varying from 4.7 to 5.0% N in early summer and from 3.0 to 3.8% at harvest and with at least 2.0% K throughout gave higher yields than those supplied with smaller amounts of N and K.

392. MEULI, L. J., AND SWEZEY, A. W.

Soil fumigation for control of sweet potato black rot (*Ceratostomella fimbriata*).

Abstr. in *Phytopathology*, 1949, 39: 861.

When ethylene bromide was used as a soil fumigant, black rot of sweet potato was greatly reduced. At the strength used ethylene bromide has little direct fungicidal action and the control is attributed to the absence of wounds (the fungus is a wound parasite) that would have been caused by the soil pests had they not been killed by the fumigant.

Tung.

393. LAGASSE, F. S., AND OTHERS.

Methods of determining the oil content of tung fruits and factors affecting it.

Circ. U.S. Dep. Agric. 806, 1949, pp. 24, bibl. 15, 10 cents.

For purposes of breeding and selection, preliminary experiments were made to determine (1) a satisfactory method of preparing a sample of tung fruits and determining their moisture and oil contents; (2) the variation in oil content of mature fruits of individual tung trees and in the number of fruits required to obtain a sample representative of a tree or a plot; and (3) the association of external factors or tree characteristics with the oil content of the fruits. Satisfactory methods of determination are described. The fruits of some seedling trees are more variable in oil content than those of others. In nearly all instances the degree of precision attained by using a 25-fruit sample is such as to permit distinguishing 2 samples differing in oil content of the whole fruit by not less than 2%. Wide variations in oil content existed among the fruits of the tung trees studied. The best oil content is to be

expected in early-maturing fruits borne in clusters of 4 or less. Thin-hulled fruits with well-filled nuts tend to have good oil content. It is concluded, however, that an actual chemical analysis is the only satisfactory criterion of oil content for use in breeding and selection.

394. SELL, H. M., AND JOHNSTON, F. A., Jr.
Biochemical changes in terminal tung buds during their expansion prior to blossoming.
Plant Physiol., 1949, **24**: 744-52, bibl. 11, illus.

The time at which biochemical changes associated with the breaking of dormancy in terminal tung buds are initiated, and the kinds and amounts of organic and

inorganic reserve materials accumulated by such buds from the time they begin to expand until the inflorescence is complete, was investigated at the U.S. Field Laboratory for Tung Investigation, U.S.D.A., Gainesville, Florida. Among other results, it is shown that substantial amounts of inorganic nutrients are required during the period of expansion of the tung buds.

Noted.

395.
 a SINCLAIR, W. B., AND CRANDALL, P. R.
Carbohydrate fractions of lemon peel.
Plant Physiol., 1949, **24**: 681-705, bibl. 24.

TROPICAL CROPS.

General.

(See also 144, 459, 472, 487, 488, 490, 491.)

396. ATHERTON, D. O.
Native agriculture in New Guinea.
J. Aust. Inst. agric. Sci., 1948, **14**: 107-12
 [received 1949].

An account of a primitive agricultural system in which the more important crops are coconut, banana, sweet potato, yam, taro, cassava and sago. The natives have virtually no tools, no grains, and very few domestic animals.

397. TERRA, G. J. A.
De tuinbouw in Indonesië. Erfbouw, vruchten-teelt, groenteteelt en sierteelt. (Horticulture in Indonesia. "Compound" gardening, fruit culture and culture of ornamentals.)
 W. van Hoeve, The Hague, 1949, pp. 128, bibls. 52, 48, 12 and 11, fl. 3.50.

This publication is a reprint of the chapter on horticulture in *De Landbouw in den Indischen archipel*, Deel IIA, edited by C. J. J. van Hall and C. van de Koppel in 1948 [for review see *H.A.*, 19: 686]. It deals with the subject in 4 sections. "Compound" or "mixed" gardening is treated most fully, as little has previously been written on the subject. Compounds, communally owned by the villages, play an important part in the agricultural economy. Before the war 20% of the agricultural land in Java consisted of these compounds. They provide vegetables, fruit and coconuts, an important supplement to the staple native diet of rice, maize and cassava; they also provide herbs, spices, flowers, building material (especially bamboos) and firewood. The gardens vary tremendously in size, productivity and crops grown, but mixed cropping is characteristic. The distribution and importance of some of the major tree crops is dealt with, and the possibility of developing and improving these gardens by such means as drainage, terracing and the introduction of new and disease-resistant crops is discussed. *Fruit culture*, other than that in the compounds, is on a small scale. General propagation and cultural practices are described, and the problems of marketing discussed. The low purchasing power of the people, the high costs of transport and the perishable nature of tropical fruits are outstanding problems. Brief notes are given on the distribution, culture and uses of individual fruits, arranged according to families.

Vegetables are only grown commercially to supply the towns, as the rural population relies on the produce of the compounds. Cultivation of European vegetables is mostly confined to the hill land, where terracing, irrigation and organic manuring are widely practised. Many European vegetables, including cabbage, kale, chicory, leeks, beans, peas, cauliflower, beet and potatoes, can only be grown successfully at high altitudes (above 600-1,200 m.). The problems of long- and short-day plants and seed production in the tropics are briefly dealt with. Individual vegetables, both European and tropical, are scheduled in the same way as the fruits. *Ornamentals*. Flowers for cutting are widely grown, but mainly on smallholdings, and there are few plant nurseries. It is suggested that the development of a nursery trade should be encouraged, and that a valuable export trade in seeds and bulbs of tropical plants could be built up. The ornamentals most widely grown in Indonesia are listed and discussed under the headings "Ferns, conifers, palms and bamboos", "Herbaceous flower and foliage plants", "Orchids", and "Climbers, shrubs and trees".

398. VERBOOM, W. C.
Opmerkingen over de cultures en de ladangbouw in het stroomgebied van de air Moesi. (Observations on the crops and "ladang" system of cultivation in the Musi river basin [S. Sumatra].)
Bergcultures, 1949, **18**: 207-9.

Three agricultural districts are distinguished in the Musi river basin, which covers the southern half of Sumatra. In the east is a strip of marshy land, 100 km. wide, which is poor in nutrients and practically useless for agriculture. Rubber can be grown on the sandy river embankments but transport is expensive. Part of the land is suitable for fruit-growing but this area is so over-populated that large plantations are impossible. The higher ground farther west is of good structure but is leached of nutrients by heavy rains. Only the humus layer, built up by leaf-fall in the forests, is fertile. Here a "ladang" system of cultivation is practised, in which a patch of woodland is cleared and cultivated for 1-3 years and then left fallow for the next 10-15 years to accumulate another layer of humus. Rubber and oil palm are chiefly grown. The third district is the Barisan mountain range, partly covered with primeval forest. Here, too, it is only the humus layer that is fertile, except on the slopes of recently active volcanoes where tea and cinchona plantations thrive. Coffee

was once a successful crop in this district, but the land has deteriorated through bad cultivation practices.

Cacao.

399. EBES, K.

De mogelijkheden voor de cacao-cultuur in Indonesië. (Possibilities for cacao culture in Indonesia.)

Bergcultures, 1949, 18: 233-7, bibl. 2.

Many factors favour the extension of the *Cacao* growing industry in Indonesia. Owing to the world shortage of cocoa there is a ready market. The heavy rainfall (4,200 mm. in Buitenzorg) is favourable, but as *Cacao* does not grow well where the temperature falls below 15° C., the upper limit in Indonesia is 600 m. above sea level. In general the soils on which coffee and rubber will grow are suitable. The devastating diseases, swollen shoot and witches' broom, are unknown in Java. Other serious pests and diseases, however, do occur, the most important being the *Cacao* moth (*Acrocercops cramerella*), *Helopeltis*, and *Phytophthora palmivora*. The position regarding plant material is good, as there is an ample supply of selected seedling material, and grafting material of 3 tested clones will be available in 2 years' time.—C.P.V. Research Station.

400. NAUNDORF, G., and FERNANDO VILLAMIL, G.

Contribución al estudio de la fisiología del cacao (*Theobroma cacao* L.). Caída prematura y marchitamiento de los frutos jóvenes y posibles sistemas para evitarlo. (Primera nota.) (A contribution to the study of the physiology of cacao. Premature fruit fall and cherelle wilt of the young fruits, and possible ways of avoiding it. Preliminary note.)

Not. agron. Palmira, 1949, 2: 81-93, bibl. 28.

After a brief discussion of the work that has been done on cherelle wilt and premature fruit fall of cacao fruits, and of the various factors involved, the authors suggest another factor that may play an important part in the problem, namely hormone action. This may be related to the effect of water and nutrient supply on the wilt. Preliminary investigations showed that a fruit developing in a flower cushion with few flowers has a better chance of reaching maturity and grows more rapidly than one in a cushion containing many flowers. Moreover, the percentage of wilt and premature fall was much higher in these large cushions (containing 10-30 flowers), and also on trees bearing many old fruits. Removal of all flowers from a cushion after one young fruit had started to develop greatly reduced the incidence of wilt and increased the size of the fruit. A relationship between flower and fruit development and hormone production is pointed out. Reference is made to further work on the control of wilt and premature fruit fall by the use of growth substances.—Estación Agrícola Experimental de Palmira, Colombia.

Coconuts.

401. O'CONNOR, B. A.

Premature nutfall of coconuts in the British Solomon Islands Protectorate.

Agric. J. Fiji, 1949, 20: 27-9, bibl. 12.

Premature nutfall in Guadalcanal, etc., was shown before the war to be due to the puncturing of female flowers and young nuts by the Coreid bug, *Amblypelta cocophaga*. The yellow tree-ant *Oecophylla smaragdina subnitida* kept *Amblypelta* in check in some areas; in others two other ants, notably *Pheidole* spp., drove out the tree-ant but had no effect on the bug. After the war, however, it was found that the tree-ant had re-established itself in many areas and that premature nutfall was less pronounced. Observations suggest the explanation to be the great increase in undergrowth and frond debris that occurred during the war. The *Pheidole* ants commonly nest at the base of palms, and the tree-ants, nesting in the upper parts of the trees, can only pass freely to the ground and thence to other trees, if a bridge of vines or fallen fronds provides a by-pass to the *Pheidole* nests. Artificially formed bridges of fronds appeared to confirm this. Spraying with chlordan emulsion and DDT dissolved in diesel oil both proved very effective in killing colonies of injurious ants. G.K.A.

Coffee.

(See also 478.)

402. LAMBERS, M. H. R.

De toepassing van modern plantmateriaal en verhoging van de productiecapaciteit van koffie ondernemingen. (The use of modern plant material and methods of increasing the production capacity of coffee plantations.)

Bergcultures, 1949, 18: 194-201.

The coffee plantations of Indonesia are in sore need of renovation. After the Japanese occupation, some plantations were grubbed and the soil has deteriorated through exposure; some were cut down to a height of 1 m. to allow other crops to be grown, and in these the soil and root systems are in good condition, but the trees need re-heading; and some were maintained in production but seriously neglected. The best ways of restoring these plantations to productivity are dealt with. Mulching and cover cropping are recommended to restore soil fertility. The nature of available planting material, from both seedling and clonal sources, is discussed, and propagation by cuttings is recommended as the quickest method of producing this. Finally, the top-working of old trees and choice of scion material are dealt with in detail.—C.P.V. Research Station, Djember.

403. BERGAMIN, J.

A broca do café. (The coffee berry borer.)

Rev. Fazendeiros, 1948, 10: 120: 24-8.

The fluctuations of the coffee berry borer population in S. Paulo, Brazil, since 1944 are correlated with the weather conditions and life history of the insect. A few control measures are recommended.—Inst. Agron. Campinas.

Fibres.

(See also 461.)

404. HOBBS, J. C.

Manila hemp production—a problem for the Filipinos.

For. Agric., 1949, 13: 249-53, illus.

Before the war the export of manila hemp from the

Philippines accounted for 97% of the world's supply. Production was centred in 3 distinct regions: the Bicol region, the Eastern Visayan Islands, and the Province of Davao. In the first two of these, typical peasant methods were used and the crop was grown as a side line only. Low yields, hand stripping and subsequent mishandling resulted in low quality fibre obtained at high cost. In Davao, however, the Japanese controlled about four-fifths of the planted area, and their system of carefully supervised tenant farming, and the use of machinery and efficient plantation methods of cultivation, resulted in reduced production costs and first-class, uniform quality fibre. The poor condition of the industry after the war, due to reduction of acreage, neglect, exploitation, and the evacuation of the Japanese, is described, and the possibilities of recovery and dangers of competition from other countries are discussed.

405. BELISARIO, M. C.

A comparative study of four varieties of ramie.

Philipp. Agric., 1949, 32: 185-214, bibl. 8.

Four varieties of ramie, known as Saikeseisin, Guiran Taipan No. 1, Formosa and Kogai, were compared as to shoot emergence, flowering period, maturity period, height of plants, stooling habit, branching tendency, susceptibility to pests and diseases, botanical characters, and the analysis of fresh stalks. Formosa gave the highest computed dry-fibre yield per hectare and should be preferred to the others for commercial plantings. G.K.A.

Fruits.

406. O'NEILL, D. K.

Testing bananas for salicylanilide. Suitable field technique developed.

Agric. Gaz. N.S.W., 1949, 60: 413-14.

Dipping bananas in salicylanilide is now compulsory in New South Wales for the control of the squirter disease, and a test has been developed for the detection of salicylanilide deposits on banana skins.

407. SIMMONDS, J. H.

Dipping of winter bananas [in Queensland].

Qd agric. J., 1949, 68: 274-5.

Directions are given for dipping the fruit in salicylanilide, now compulsory, to prevent the development in storage of squirter and winter black end caused by *Nigrospora sphaerica*.

408. TIPLER, R. V.

Banana leaf spot (*Mycosphaerella musicola* Leach): the disease and its control.

Pl. Prot. Overs. Rev., 1949, 1: 2: 35-41.

Control of this disease is discussed under: spraying, spray materials, application of sprays, crop hygiene, shading and varieties. Bordeaux mixture 1% and $\frac{1}{4}$ % Perenox are both very effective for its control.

409. MUKHERJI, S.

A monograph on the genus *Mangifera* L.

Lloydia, 1949, 12: 73-136, bibl. 44.

The author describes 41 valid species and 8 doubtful species. De Candolle considers that the mango has been cultivated for more than 4,000 years. The cultivated varieties of Indian mango probably resulted from a fruit improvement drive of the Mohammedan emperors in India in the sixteenth century. Various

important workers on the different species are named. A key for the identification of these species is presented.

410. STEPHENS, S. E.

The mango [in Queensland].

Qd agric. J., 1948, 68: 71-81, 146-53, 208-15, illus.

A comprehensive article which briefly touches on the botany of tree, flower and fruit; the growth habits of tree, flowers and roots; pollination; mono- and polyembryony; climatic and soil requirements; propagation by seed, budding (illustrated), and inarching; cultural practices; fruiting; and harvesting. Propagation is almost entirely from seed, several races being recognized, amongst them the Common, the Peach, and the Apple, or Kensington. Yields, which are very variable, are estimated at about 8 bushels per tree [per annum] for the Common variety. Kensington averages about 4 bushels per tree at 10-15 years. Trees over 25-30 years produce about double the above figures. Mangoes are subject to the usual attacks by fruit flies, as well as by two pests peculiar to this crop, the mango weevil, *Cryptorhynchus mangiferae* and the tip borer, *Peperita euthysticta*. Injury and loss are also caused by anthracnose.

411. COLLINS, J. L.

History, taxonomy and culture of the pineapple.

Econ. Bot., 1949, 3: 335-59, illus.

Although the wild species of pineapple, native to tropical America, are seeded, seedless varieties were selected and cultivated by the Indians or their predecessors long before the advent of Columbus. In this semi-popular article an account is given of the distribution and taxonomy of the wild and cultivated species, the history of the main cultivated varieties, and the methods of cultivation practised in Hawaii. Some mention is also made of cultural practices in other countries. Figures are given of the annual production of canned pineapple in the main producer countries of the world.

Oil palm.

(See also 474.)

412. VANDERWEYEN, R., AND ROELS, O.

Les variétés d'*Elaeis guineensis* Jacquin du type *albescens* et l'*Elaeis melanococca* Gaertner (em. Bailey). Note préliminaire. (A preliminary note on the *albescens* type of *E. guineensis* and on *E. melanococca*.)

Publ. Inst. nat. Étude agron. Congo belge, Ser. sci., 42, 1949, pp. 24, illus., 30 fr.

I. *E. guineensis*. Among the main characters requiring consideration in the selection and breeding of improved types of African oil-palm are (i) the production of a light-coloured oil that is easily decolorized and (ii) a short trunk form which will facilitate harvesting and extend the economic life of the trees. In the Congo most of the oil produced is relatively dark and difficult to decolorize compared with that produced in the Far East. Most of the trees, too, grow relatively tall, though shorter types do exist, and examples are cited of trees showing relatively short elongation annually and relatively high yields when these are expressed in terms of production per running metre of trunk. (i) To obtain oils that are easily decolorized

particular attention is being paid to the *albescens* type, so called from the absence of carotene in the pulp at the time of maturity. *Albescens* types should be found among palms differentiated according to fruit colour before maturity (*nigrescens* and *virescens*) and according to thickness of the shell (*dura*, *tenera* and *pisifera*), a total of six possible combinations. *Albescens* palms are, however, very rare and widely scattered, and so far only three combinations are represented in a collection at Yangambi, though other combinations have been reported elsewhere. The chemical nature of *albescens* oil is discussed with particular reference to rate of oxidation. II. *E. melanococca*, the American oil-palm, is described botanically in some detail and compared with *E. guineensis*. As regards selection, the most interesting feature of *E. melanococca* is its short trunk. Although oil yield of specimens grown in Yangambi and described elsewhere is not high, it seems likely that a survey of the natural habitat of the species will reveal high-yielding types. If, then, these were crossed with selected palms of *E. guineensis* it should be possible to develop hybrids with short trunks giving high yields of oil with or without carotene. The text is accompanied by photographs and diagrams. G.K.A.

413. ERHART, H.

Observations sur la culture du palmier à huile en Angola. (Cultivation of the oil palm in Angola.)

Oléagineux, 1949, 4: 654-8, illus.

The author describes the oil palm plantations on the experimental farm of the Sugar Company of the Dendé Valley, Angola, where the industry is successfully combined with that of sugar-cane production. The climate here is one that would generally be considered quite unsuitable for the oil palm, having a relatively low rainfall and a pronounced dry period. The plantations, however, are in good health and the yields remarkably high, averaging 1,500 kg. of oil per hectare. It is suggested that this is due to a constant supply of moving water from the high water table. Only where the soil is coarse and the water does not rise readily by capillarity do the trees suffer from drought. The plantations also profit considerably from the irrigation systems of the sugar-cane fields. The trees are of indigenous origin, and it is probable that a race of *Elaeis*, well adapted to local climatic and soil conditions, has been developed by natural selection. It is interesting to note that plants introduced from the Belgian Congo, specially selected for high yielding qualities, yielded less well in Angola than the native plants. The relative importance of soil, climatic and genetic factors in the cultivation of the oil palm are considered. The author suggests that there are many districts of French tropical Africa, in particular the Ouémé delta in Dahomey, that have soil conditions similar to those of the Dendé valley, and where the cultivation of the oil palm might profitably be extended.

Rubber.

414. DE SILVA, C. A.

Agricultural experimental work of the Rubber Research Scheme. 1939 clone trial, Field 6A, Nivitigalakele.

Quart. Circ. Ceylon Rubb. Res. Scheme, 1949, 25: 3-9.

Forty-four clones consisting of 29 Tjikadoc seedling clones, 3 stock marcot clones and 4 estate mother tree clones with 4 standard imported and 4 promising local clones were planted in a randomized block layout in cleared jungle in 1939. Girth measurements are tabulated for each year from 1940 to 1948 inclusive, and yields per tree are recorded for 4 years from 1945. So far 9 of the new clones have been selected as sufficiently promising to merit extended trial on a semi-commercial basis, several of them having yielded considerably more than the best of the control clones, Prang Besar 86. G.K.A.

415. HUNTLEY, G.

The £50 clearing.

Quart. Circ. Ceylon Rubb. Res. Scheme, 1948, 25: 14-17.

Costings of economic rubber production with notes on methods of production adopted.

416. ANON.

Collection and planting of clonal seed (rubber).

Quart. Circ. Ceylon Rubb. Res. Scheme, 1948, 25: 24-7, illus.

In recent years a number of budded areas on estates in Ceylon have been approved as sources of clonal seed, and these notes give details of layout with isolation belts, the collection of seeds and a list of approved clones. As selfing is the exception rather than the rule, the biggest quantities of seed are generally found along lines of contact of two adjoining clones and the majority of seedlings will represent crosses between these two clones. This enables some degree of uniformity as to male parents to be obtained. With practice, seed from different mother clone parents can be identified and thus prevent risks of mixing. As to the use of selfed seed, only that of TJ.1 has done well so far, though selfed seedlings of BD.5 have proved satisfactory in Malaya. Second generation seed from clonal seedlings is unreliable and should not be used. G.K.A.

417. PFÄLTZER, A., AND VOLLEMA, J. S.

Over de invloed van het bodemdek op de diktegroei van hevea. (The effect of soil cover on the growth of hevea.) [English summary 2½ pp.]

Arch. Rubbercult. Ned.-Ind., 1949, 26: 289-301, bibl. 4.

An experiment was laid out in the Soemoerbarang Estate, West Java, to investigate the effect of various soil treatments on the growth of young hevea trees. The treatments consisted of (a) clean weeding, (b) a closed cover of *Centrosema pubescens*, (c) a cover of *Centrosema pubescens* with clean weeded circles round the trees, (d) interplanting with hedges of *Tephrosia maxima*, and (e) interplanting with *Derris elliptica* as a catch crop. The following conclusions, probably widely applicable to conditions in West Java, are drawn. Young rubber trees grow most quickly under treatment (a), but this cannot be recommended as it may lead to soil erosion, and infection from *Fomes lignosus* is more frequent. Trees under treatment (c) will become tappable nearly as soon as under (a), and the dangers of clean cultivation are avoided. Treatment (b) will retard growth slightly but will not delay tapping long. The same is true of (d) if the hedges

are pruned early enough; interplanting with hedges, however, does not check erosion altogether. Treatment (e) may retard tappability for one year, because of the disturbance caused by harvesting the *Derris* crop.

418. VOLLEMA, J. S.

Over de invloed van de waterstof-ionen concentratie op de groei van rubber. (On the influence of the hydrogen-ion concentration on the growth of rubber.) [English summary 2 pp.]

Arch. Rubbercult. Ned.-Ind., 1949, 26: 257-68, bibl. 5, illus.

Two pot experiments, sandy loam being used in one and clay loam in the other, were carried out to determine the influence of soil pH on the growth of hevea seedlings. The results indicate that the vigour of young hevea plants increases with the acidity of the soil, at least to a pH of 3.8 (the lowest value used in these experiments). The response was more marked on the sandy loams than on the clay loams. In some soils of West Java the top soil shows an acid, and the subsoil an alkaline reaction. In a field experiment with this type of soil, where the top soil was shallow, it was found that the growth of young plants could be stimulated by an application of 1 kg. sulphur mud in the planting hole. Where such soils have had physical properties, however, this practice is not considered an economic way of making them suitable for rubber growing.—Proefstation der C.P.V., Buitenzorg.

419. VAN SCHOONNEVELDT, J. C.

Tapproeven met twee sneden bij oculaties. (Double-cut tapping tests on budded rubber.) [English summary $\frac{1}{2}$ p.]

Arch. Rubbercult. Ned.-Ind., 1949, 26: 269-77, bibl. 1, illus.

The results obtained in 1941 from the double-cut tapping experiment No. 366 on the Bodjong Datar Estate in West Java are recorded as a supplement to the preliminary report of this experiment which gave results obtained in the 2 previous years [see *H.A.*, 12: 640]. In 1939 and 1940 the yield of the double-cut system exceeded that of the single-cut system by 34% and 32% respectively. In 1941 the increase in yield was 23%. The previous conclusion that the tested double-cut tapping system may be regarded as a permanent method of exploitation is confirmed by the course of the DRC of the latices and by the bb-frequencies in both treatments.—Proefstation der C.P.V., Buitenzorg.

420. DE SILVA, C. A.

Yields of budded rubber and clonal seedlings in commercial tapping.

Quart. Circ. Ceylon Rubb. Res. Scheme, 1948, 25: 10-13.

A further progress report is given on yields for 1946 and 1947 based on returns from 66 estates with a total acreage of approximately 6,500 acres. [See also *H.A.*, 17: 421 and 18: 665.] Clone TJ.1 has continued to give the highest yields in most cases; TJ.16 has yielded relatively well only in the drier districts; BD.5 is comparable to TJ.1, but is too susceptible to disease to be recommended; BD.10 has done well on poor soils; AV.49 and AV.50 have proved somewhat

inferior. Among new clones GL.1, PB.86 and HC.28 have given very promising results by comparison with TJ.1. Eleven estates submitted returns for clonal seedlings raised in the Prang Besar Isolated Gardens and yields so far compare very favourably with those of TJ.1 and other high-yielding clones. G.K.A.

421. SCHWEIZER, J.

De samenstelling van hevea-latex als biotisch object. (The composition of hevea latex: a biological study.) [English summary $\frac{1}{2}$ p.]

Bergcultures, 1949, 18: 266-77, 290-7, 314-33, bibl. 38, illus.

In this fundamental account of rubber formation and the composition of latex in hevea, the author deals with the causes of variation in latex composition within the plant and during the process of tapping, the physiological effects of tapping and tapping systems, the relationship between rubber formation and growth, secondary latex formation in the leaves, and the causes of brown bast disease.

422. McMULLEN, A. I.

Extraction of latex of *Hevea brasiliensis* under sterile conditions.

Nature, 1949, 164: 715-16, illus.

For the study of the mechanism of natural coagulation and deterioration of latex, which occurs on removal from the plant tissues under ordinary conditions, it is necessary to obtain samples of rubber from the living tree under completely aseptic conditions and in the absence of oxygen. The apparatus designed for this purpose is illustrated diagrammatically and the technique of extraction is described. The main feature of the instrument is a steel body, inside which the incisor or "tapping" knives may be manipulated to penetrate the latex vessels while under vacuum-tight conditions. Samples of rubber collected according to this method were found to be completely sterile. Apparatus and technique were developed in the course of a research programme undertaken jointly by the Rubber Research Institute of Malaya and the British Rubber Producers' Research Association.

423. VAN GILS, G. E.

Oproommiddelen voor hevea-latex. (Creaming agents for hevea latex.)

Bergcultures, 1949, 18: 394-7, illus.

The seeds of *Ceratonia siliqua* and *Cyamopsis tetragoloba* both contain a galactomannan that can be used as an effective creaming agent for hevea latex. The use of water-soluble cellulose derivatives for this purpose is also suggested.—Indonesian Institute for Rubber Research, Buitenzorg.

424. SOETARDI, R. G.

Geslaagde inoculatieproeven met *Phomopsis heveae* (Patch.) Boedijn, geïsoleerd uit jonge Heveazaailingen met stengelinsterving. (Successful inoculation with *Phomopsis heveae* (Patch.) Boedijn, isolated from young Hevea-seedling with die-back.) [English summary $\frac{1}{2}$ p.]

Arch. Rubbercult. Ned.-Ind., 1949, 26: 279-88, bibl. 4, illus.

Inoculation tests have shown that the fungus *Phomopsis*

heveae, isolated from hevea seedlings with an unknown dieback disease, can cause this dieback in soft, new growth of hevea. Infection does not occur in lignified tissue. The fungus causes brown lesions in the stem, 5 cm. or more from the top. These lesions may ring the stem and so kill the tip. Petioles of the upper leaves may also be attacked, causing the leaf blades to fall. Plants may outgrow the disease which is not a strong parasite and seems to attack only weak plants. Increasing the vigour of the plants by manuring, pest control, etc., is suggested as a preventive measure.—Proefstation der C.P.V., Buitenzorg.

425. VOLLEMA, J. S.

Enige waarnemingen over het optreden der bruine binnenbastziekte. (Some observations on the occurrence of brown bast disease [of hevea].)

Bergcultures, 1949, 18: 243-5.

It has been suggested that less severe tapping might reduce the incidence of brown bast in hevea. An experiment at the Tjiomas Trial Gardens, however, started in 1939, showed that the system s/3, d/2, 67% (one-third of the circumference tapped every other day) did not reduce the incidence compared with the system s/2, d/3, 67% (one half of the circumference tapped every third day). In fact there was a 10% increase. A further experiment in which the development of brown bast was periodically recorded showed that incidence increased after the rest period of the trees, being at a maximum from December to April. The suggestion is made that this is due to the fact that food reserves are utilized by the newly-developing leaves and are not available for regeneration of latex. In order to test this hypothesis a trial is being made to compare the effect of the tapping system s/3, d/2, 67% continued throughout the year with a similar system applied for only 8 months of the year, the trees being left untapped for a period of 4 months during and directly following the rest period.—C.P.V. Research Station.

426. SCHERY, R. W.

Manicoba and mangabeira rubbers.

Econ. Bot., 1949, 3: 240-64, bibl. 8, illus.

This article summarizes the information obtained during the war concerning the production of manicoba and mangabeira rubbers by trees that grow wild over the eastern half of South America. Manicoba rubber, produced by various species of *Manihot*, is the better quality; the latex contains 15-30% rubber and 3-15% resins, and coagulation occurs naturally. The various latex-yielding species of *Manihot* are described. These occur throughout the semi-arid caatinga region of north-eastern Brazil, generally on the lower slopes of mountains where there is protection from wind and some subsoil moisture in a xerophytic environment. Mangabeira rubber is obtained from several strains of the single species *Hancornia speciosa*. This species occurs in almost all states of Brazil south and east of the Amazon valley, and in north-east Paraguay, but is restricted to poor, sandy soils in localities where agriculture is generally impossible. An account is given of tapping methods, which vary with the species and local custom, coagulation of latex, treatment of coagulum, and handling and marketing practices.

A discussion of the extent to which these rubber-producing trees have been, or could be, exploited leads to the conclusion that only an intelligent planting programme, with selected material, can assure significant manicoba production in the future, and that mangabeira could never compete with hevea on the world market in quantity, quality or price. The tree appears to be too slow growing and demands too specialized an environment to lend itself to plantation practices.—Missouri Botanic Gardens.

Sugar cane.

(See also 232-240, 241c, f, 492.)

427. POTTER, T. E. K.

The control of pests, diseases, and weeds of the sugar cane in the British Caribbean.

Pl. Prot. Overs. Rev., 1949, 1: 2: 22-8.

This article consists mostly of an account of the sugar-cane frog-hopper, *Tomaspis saccharina*. It is stated that the only satisfactory, economic and practical method of control is by a treatment of the nymphs with Agrocide powder of 0.5% gamma BHC. Notes are also given on the control of other pests, of diseases, and of weeds of sugar-cane.

428. HES, J. W.

Agatslakken en suikerriet. (The African Giant Snail and sugar-cane.) [English summary 6 ll.]

Chron. Nat., 1949, 105: 226-7, bibl. 3, illus.

The African Giant Snail, *Achatina fulica*, has been found feeding on sugar-cane in Java. This crop had not previously been attacked. So far the damage done is not of economic importance, the dewlaps at the leaf-blade joints on mature stems being attacked, and superficial internodal tissue and buds on the suckers. The spread of the pest and control measures are briefly reviewed.—Java Sugar Industry Research Station, Pasuruan.

Tea.

429. GLOVER, P. M.

Hedge planting of tea.

Memor. Indian Tea Ass. Toklai 21, 1949, pp. 36.

Although there is little or no mature hedge-planted tea in N.E. India the method offers so many advantages over square or triangular spacing that this detailed paper has been prepared to describe practical methods of procedure. The main advantages to be expected from hedge planting are higher yields per acre, the development of mechanized pruning and plucking, power spraying and dusting, and contour and terrace planting to control soil erosion. Among the points discussed are:—*Single v. double hedges*: Suggested spacings for most purposes are 5 ft. × 2 ft. or 5 ft. × 2½ ft. and (double) 5 ft. × 2½ ft. × 2½ ft. *Closer spacing* in hedges is not expected to lead to detrimental competition. *Orientation of hedges*: Configuration of the ground is considered to be generally more important than alignment in relation to the sun, short hedges

facilitating plucking. *Size of blocks:* Blocks of about 5 acres are recommended. *Shade:* Alternative layouts are described and suitable species listed; it is suggested that permanent shade be established in the hedgerows and temporary shade in the gaps between hedges. *Pruning:* A suggested programme is tabulated. *Manuring:* Following a basic application of 5-10 lb. cattle manure per pit at planting, suggested programmes are tabulated for a 12½% mixed N fertilizer and for sulphate of ammonia on young plants and on mature tea. Applications of P and K are also recommended. In general it is considered that heavier manuring will be necessary for hedge-planted tea than for regular spacing. *Green cropping:* A 4-year programme based on *Boga medeloa* and *Crotalaria anagyroides* is described. *Plucking machines:* Apart from the Tarpen which can pluck double hedges with some stretching and a newly designed Grafton hand-operated model which will pluck individual bushes or single hedges, a power-driven Grafton machine has been designed which will span double hedges and is intended to prune and spray as well as pluck, with a plucking capacity of about 10 acres a day. Such mechanical aids must be carefully considered in deciding the layout and method of spacing to be adopted. *Other points* discussed are intercommunication paths, amounts of seed required, staking out, hedge planting on sloping land, drainage, and closer hedge planting where a variety of upright habit is grown. G.K.A.

430. REITSMA, J., AND VAN EMDEN, J. H.
De bladpokken-ziekte van de thee. I.
(Blister blight of tea. I.)
Bergcultures, 1949, 18: 218-31, illus.

In Indonesia the blister blight fungus (*Exobasidium vexans*) was first observed in April, 1949, in the Bah Butong plantation at Pematang Siantar, Sumatra. It has since spread rapidly, as climatic conditions are very favourable. To aid efficient control, the 7 stages in the life cycle of the fungus are fully described and illustrated. The authors found that in Sumatra the time required from infection to sporulation was only 10-12 days, the shortest time ever recorded. They also observed that infection could occur through the upper surface of the leaf. Control measures, mostly based on practices in other countries, are discussed in general, and in greater detail for sporadic infections, lightly infected plantations, heavily infected plantations, and plantations not yet in pluck. Efficient management of pruning, plucking and shading is the basis of control. Copper sprays can be used as preventives, and should be applied, if possible, with power sprayers. The development of resistant clones will be investigated, but this is a long-term policy. Notes on control measures in Ceylon, abstracted from the *Proceedings of the 8th Conference of the Tea Research Institute of Ceylon*, are given in an editor's note.

431. VAN EMDEN, J. H., AND REITSMA, J.
De bladpokken-ziekte van de thee. II.
(Blister blight of tea. II.)
Bergcultures, 1949, 18: 370-7.

The incidence of blister blight infection in 7 tea plantations on the east coast of Sumatra was studied, in order to obtain information on the effect of local conditions, such as altitude and shade, on the development of the

disease. Plantations below 600 m. were not seriously infected; above this altitude infection was severe where shade was heavy. The number of hours sunlight and relative humidity also had a marked effect on the spread of infection. Laboratory experiments indicated that spore germination requires 10-11 hours, that spores do not penetrate the cuticle of young leaves in absence of water, and that the fungus can be grown for 6 days in *togé* agar culture. A field trial designed to compare the fungicidal value of certain copper compounds and new fungicides for control of blister blight is described, but results are not yet available. Possible future lines of investigation are discussed.—C.P.V. Research Station.

Sundry.

432. LOUSTALOT, A. J.
Effect of fertilizer treatments on yield of bay leaves, oil, and phenol.
Proc. Amer. Soc. hort. Sci., 1949, 53: 517-19.

Although the addition of ammonium sulphate to bay rum trees (*Pimenta racemosa*) in Puerto Rico increased oil production, its use proved uneconomic.

433. PFÄLTZER, A.
Overzicht van de ziekten van dadap (*Erythrina* sp.) en lamtoro (*Leucaena glauca*). (I en II.) (Survey of the diseases of dadap and "lamtoro". I and II.)
Bergcultures, 1949, 18: 379-91; bibl. 50, and 397-409, bibl. 27.

In this annotated list of diseases of 2 shade trees, the author indicates which diseases also infect the crop plants, and reviews the work that has been done on the subject.

434. HERNÁNDEZ VIDAURRETA, M.
El jengibre; el achiote; el huisquil. (Ginger; the annatto tree; the chayote.)
[Publ.] *Minist. Agric. Guatemala*, Año 2, No. 19, 1949, pp. 10.

A brief account of the culture and uses of these three crops. Methods of preparation of the ginger rhizome for market, and extraction of the colouring matter from the seeds of the annatto (*Bixa orellana*) are also described.

Noted.

435.
a BURTT, B. L., AND LEWIS, P.
On the flora of the Kuwait [Arabia]: I.
Kew Bull., 1949, 3: 273-308.
b CHEESMAN, E. E.
Classification of the bananas. III. Critical notes on species. (K) *Musa laterita*. (L) *M. textilis*.
Kew Bull., 1949, 3: 265-72, bibl. in text, illus.
[For I and II, and III a to i, see *H.A.*, 18: 2230 and 3018c and *H.A.*, 19: 646b, 1607e and 3490b.]
c HOWARD, R. A.
The genus *Coccoloba* in Cuba.
J. Arnold Arbor., 1949, 30: 388-424.

d PIERIS, W. I.

Rubber production on small holdings.

Quart. Circ. Ceylon Rubb. Res. Scheme, 1948, 25: 21-3.

Includes a brief note on a technique for making sheet.

e REYNEKE, J., COETZEE, W. H. K., AND BESTER, J. J. A.

Rooibos tea [*Aspalanthus contaminatus* (Tubg, Druce)]. A preliminary report on the composition.*Fmg S. Afr.*, 1949, 24: 397-8, 409; 412, bibl. 8.

f TAYLOR, A.

The copper content of coffee and coffee products.

Chem. Industr., 1949, pp. 737-8, bibl. 2.

g YUNCKER, T. G.

Additional notes on the Fijian species of *Peperomia*.*J. Arnold Arbor.*, 1949, 30: 443-9.For previous notes see *Bishop Mus. Bull.* 141: 25-47, 1936 and *Bishop Mus. Occ. Pap.* 17: 215-20, 1943.

STORAGE AND PLANT PRODUCTS.

Storage.

436. TRUSCOTT, J. H. L., FRANKLIN, E. W., AND GILLIAT, J.

Automatic ventilation of common storages.

Sci. Agric., 1949, 29: 497-511, illus.

This is a study of the performance, in terms of storage temperatures, of two common storages [i.e. unrefrigerated cold stores for vegetables, fruit and nursery stock] situated on the campus of the Ontario Agricultural College, Guelph. The study is concerned largely with the problem of reaching and maintaining a temperature of 32° F. Estimates of performance during the past 20 years show that the chief weakness of the common storage is the variation in the date at which 32° F. can be reached and maintained in the autumn. The adoption of an automatic ventilation system has resulted in much more efficient utilization of the cool outside air than is practicable with manual controls. It is now believed that in an adequately insulated storage, with automatic ventilation the temperature may be kept at least 6° F. below that represented by averages of outside maximum-minimum temperatures. The automatic ventilation system and differential thermostat used are described in detail.

437. PRATT, R., DUFRENOY, J., AND PICKERING, V. L.

Vitamin K₈ as a preservative for fruits and a disinfectant for seeds.Abstr. in *Phytopathology*, 1949, 39: 862.

Vitamin K₈ (2-methyl-4-amino-1-naphthol hydrochloride) has been used successfully in the laboratory to prevent spoiling of prunes, grapes and dates, and to prevent rotting of seeds of peas, corn, cucumber, cotton and mustard.

438. ROSE, D. H., WRIGHT, R. C., AND WHITEMAN, T. M.

The commercial storage of fruits, vegetables and florists' stocks.

Circ. U.S. Dep. Agric. 278, slightly revised 1949, pp. 60, bibl. 123, 20 cents.

After a preliminary survey of the factors involved in the cold storage of plant material and a discussion of the effect of cold storage on subsequent behaviour of fruits and vegetables, the authors turn to the consideration of the optimum cold storage conditions for most of the common fruits such as apples, apricots, etc., including bananas, coconuts, oranges, strawberries, etc. They do the same in turn for vegetables and for

cut flowers, florists' greens, rhizomes, tubers, corms and bulbs.

439. VAN HIELE, T.

Gasbewaring van fruit. (Gas-storage of fruit.) [English summary $\frac{1}{2}$ p.]*Meded. Dir. Tuinb.*, 1949, 12: 761-70, bibl. 6, illus.

A review of the subject with notes on the damage that may result from too high concentration of carbon dioxide or by too low an oxygen concentration.

440. ROOF, Q. W.

Plastic sealing of tobacco storage warehouses.

Misc. Publ. U.S. Dep. Agric., Prod. Market Administ. 684, 1949, pp. 34, bibl. 2, illus.

The form of sealing described in great detail here can be applied quickly and without highly skilled labour. Tests were very successful. Though tested only on tobacco warehouses, it may be found practical in other types of store. Materials, equipment, labour, application, and costs are all fully dealt with. The material used is a vinylite plastic film formerly used in the U.S. Navy and known as OS-3602.

441. VAN HIELE, T.

Een nieuwe fruitbewaarpplaats met automatische bediening. (A new fruit storage installation with automatic service.)

Fruitteelt, 1949, 39: 800-2, illus.

A new apple storage installation at Zetten, Holland, is described with plan, elevation, section and photographs. Its capacity is a million kg. of fruit (50,000 cases). There are five compartments, in the middle one of which the fruit is sorted when brought in. The ventilation is regulated thermostatically.

442. DEWALD, F. L. P.

Voorbeeld van een tijdelijke fruitbewaarpplaats. (A temporary fruit store.)

Fruitteelt, 1949, 39: 604-7, illus.

A temporary store with an arched thatched roof, for use when there is a glut of fruit, is described and illustrated to show plan, elevation and cross section.

443. HARTMANS, E. H., AND CRAVENS, M. E., Jr.

Factors affecting retail peach sales.

Quart. Bull. Mich. agric. Exp. Stat., 1949, 32: 1-11, bibl. 2.

The degree of ripeness as measured by softness was the most important factor in peach quality affecting sales, appearance of the fruit being another major factor.

Twenty-two per cent. of the peaches handled by the stores were lost because of rots, bruises and other defects.

444. CARDINELL, H. A., AND BARR, C. G.
Packing-house treatments of Michigan peaches.
Quart. Bull. Mich. agric. Exp. Stat., 1949,
 32: 70-93, bibl. 11.

This is a progress report of further trials to improve market quality in peaches on the lines adopted in the first report (see *H.A.*, 18: 3030). A considerable part of the paper is devoted to the treatment of the fruit in Stericoolers (ice-water [32° F.] plus 100 p.p.m. Hypo-Chlor, a chlorine-type fungicide), and a discussion of the cost involved in the operation. The study also illustrates the relation of age of fruit and temperature to peach spoilage, irrespective of treatment.

445. PINTO, J. A. G.
 Algumas considerações sobre o transporte e a maturação artificial das bananas remetidas da ilha da Madeira para o Continente.
 (On the transport and artificial ripening of bananas sent from the island of Madeira to the Continent.)
Bol. Junta nac. Frut. Lisboa, 1949, 9: 88-100, illus.

The starting of a regular service of boats for carrying bananas from Madeira to the Continent is announced. The advantages of such a service of specially equipped boats is emphasized in view of the great losses experienced in the past during transport.

446. HARDENBURG, R. E.
 Temperature changes of prepackaged vegetables in refrigerated cases and on iced trays.
Proc. Amer. Soc. hort. Sci., 1949, 53: 407-10, bibl. 1.

Refrigerated cases proved more satisfactory than iced trays for holding sweet corn, peas, green beans, lima beans and celery at low temperatures.

447. HARDENBURG, R. E.
 Moisture losses of vegetables packaged in transparent films and their effect on shelf-life.
Proc. Amer. Soc. hort. Sci., 1949, 53: 426-30, bibl. 4.

300-MSAT cellophane and 75-gauge pliofilm proved effective in prolonging life and reducing moisture loss in several vegetables. Lumarith (cellulose acetate 100), a semi-moisture-proof film, was as good or better than these with other vegetables where evaporation of water was not the main cause of deterioration or where a very high humidity caused rapid mould formation.

448. ARREGUIN-LOZANO, B., AND BONNER, J.
 Experiments on sucrose formation by potato tubers as influenced by temperature.
Plant Physiol., 1949, 24: 720-38, bibl. 20.

The carbohydrate metabolism of the potato and the enzyme mechanism involved was studied in relation to storage temperatures.—California Institute of Technology, Pasadena.

449. WERNER, H. O.
 Effect of position within a large storage bin upon midwinter behavior of Nebraska Triumph seed potatoes.
Res. Bull. Neb. agric. Exp. Stat. 158, 1949, pp. 22.

There was considerable difference in time of sprouting of Triumph potatoes after removal from a storage bin according to position of the tubers in the bin, where the upper central part was the warmest and the rear walls and bottom the coolest positions. The potatoes from the central part produced plants most quickly, and in field tests in Alabama there was close correlation between early plant emergence, plant size and high yields of early potatoes.

450. DOWNIE, W. A.
 The prevention of sprouting in stored potatoes.
J. Dep. Agric. Vict., 1949, 47: 301-5, bibl. 3, illus.

The sprouting of potatoes (var. Snowflake) during spring and summer was prevented by the application of a chlorinated nitro-benzene dust. Sprouting was also effectively prevented by methyl ester of alpha-naphthaleneacetic acid. Treatment should be applied as soon as possible after harvest and before the advent of high temperatures.

Plant products.

451. BARKER, B. T. P.
 Cider for farmhouse and home use.
Agriculture, Lond., 1949, 56: 386-92.

This article on making cider at home is largely an abbreviated form of a pamphlet issued by Long Ashton Research Station in 1947. G.K.A.

452. CHICK, H., AND SLACK, E. B.
 Distribution and nutritive value of the nitrogenous substances in the potato.
Biochem. J., 1949, 45: 211-21, bibl. 28.

(1) In the variety of potato studied, King Edward grown in the Fenlands, the total nitrogen varied from 1.7-2% on dry weight; the proportion present as protein varied from about 40-50% and was slightly lowered when the potatoes were stored. In the expressed juice of the raw potatoes about 30% of the nitrogen was protein nitrogen: of the non-protein nitrogen about one-fifth was present in free amino-acids, two-fifths in amides and two-fifths in nitrogenous bases. (2) At least two soluble proteins were detected in the press juice after deposition of the particles of the starch; one (α -globulin) precipitated from the diluted sap on standing at pH 4, the other (β -globulin) on boiling the filtrate therefrom. In one specimen of freshly dug potatoes the ratio of α - to β -globulin was about 1/2; in a sample of stored potatoes it was about 2/1. (3) The growth-promoting value of the potato nitrogen was usually found to be diminished after storage; the extent of deterioration depended on the conditions, being least after storage at 5°. The ratio of protein to non-protein nitrogen was also lowered after storage. [From authors' summary.]—Lister Inst., London, and Biochem. Lab., Cambridge University.

453. WOKES, F., AND MELVILLE, R.
 Apparent vitamin C in the walnut (*Juglans regia*).
Biochem. J., 1949, 45: 343-52, bibl. 25.

In fruits the highest concentrations occurred in the epicarp and mesocarp, especially in very young fruits,

* See also *H.A.*, 19: 664, 972.

in which it could form half of the total vitamin C, as measured by dye titration. In leaves the highest concentrations occurred in the mesophyll, from which there was usually a definite concentration gradient through the vascular tissue, rachis and petiole towards the stem. In the stem the highest concentration was in the phloem, in which the concentration gradient was generally from older to younger tissue during the early summer, but in the reverse direction in the winter. Remarkably high concentrations of apparent vitamin C were found in buds and catkins, in which it usually formed most of the total vitamin C. The apparent vitamin C in walnut tissues differs from reductone in (a) its stability towards ascorbic acid oxidase; (b) the increase of its dye titration value as the titration pH is reduced below 2; (c) the development, by the action of the indophenol dye or of the walnut enzymes, of a yellow compound which spectroscopically seemed to resemble juglone. [From authors' summary.]

454. CARAÑGAL, A. R., JR., AND BANZON, J.
Studies on the solvent extraction of coconut oil with ethyl alcohol.
Philipp. Agric., 1949, 32: 239-51, bibl. 3.

Using sun-dried shredded coconut, which proved more suitable than somewhat larger copra shavings, up to 93.4% extraction of oil was obtained in boiling 95% ethyl alcohol on a laboratory scale. The percentage extraction increased as the solvent:oil ratio was increased from 4:1 to 10:1, and as the time of extraction was extended from 2½ to 15 minutes until equilibrium was reached. In the case of a 10:1 solvent:oil ratio this was reached in 7½ minutes. The addition of ether and acetone, particularly the former, up to 50:50 parts by volume of the 4:1 solvent:oil ratio also increased the percentage oil extracted. G.K.A.

455. FRENCH, R. B., AND ABBOTT, O. D.
Levels of carotene and ascorbic acid in Florida-grown foods.
Bull. Fla agric. Exp. Stat. 444, 1948, pp. 21, bibl. 13 [received 1949].

Suggestions are made in regard to methods of analysis for ascorbic acid and carotene. Carotene and ascorbic acid values of 31 different fruits, 35 vegetables, and 17 wild greens are reported. The subtropical pink guava, Ceylon gooseberry and mango are excellent sources of both carotene and ascorbic acid, while for ascorbic acid alone the best sources are citrus, jujube, sapote and papaya. Greens in general are excellent sources of both factors. Special attention is called to the high worth of wild greens. Several varieties of each of 14 fruits and vegetables were analysed for levels of

carotene and ascorbic acid. In some cases large differences in amounts of these nutrients suggest that genetical factors controlled levels. Minor element supplementation, where deficiencies were not apparent, had no effect on levels of ascorbic acid in lettuce or cabbage, or on carotene in the latter. The same conclusion was reached with papayas receiving different levels of potash fertilization. [From authors' summary.]

456. CORDIER, G.
De la composition de quelques produits fourragers tunisiens et de la valeur pour l'alimentation du mouton. (The composition of some Tunisian products used as fodder and their value for the feeding of sheep.)
Ann. Serv. bot. agron. Tunis., 1947, 20: 27-108, bibl. 9, illus. [received 1949].

Among 457 products, the analyses of which are tabulated, are included cactus, dried figs, dates, the residues of olives, grapes and various oil seeds, citrus pulps, and several vegetables. G.K.A.

Noted.

457.
a GRIFFITHS, D. G., AND POTTER, N. A.
Effects of the accumulation of volatile substances produced by apples in gas storage.
J. hort. Sci., 1949, 25: 10-18, bibl. 5.
b JAMES, D., AND CRANG, A.
The enzyme system and browning of processed pears.
A.R. Long Ashton agric. hort. Res. Stat. 1948, 1949, pp. 234-40, bibl. 7.
c KELLY, J. T., AND PUGSLEY, L. I.
The relation between [insect] filth in whole figs and filth recovered from fig paste.
J. Ass. off. agric. Chem. Wash., 1949, 32: 762-6, bibl. 2.
d KIESER, M. E., POLLARD, A., AND STONE, A. M.
The clarification of apple juice.* The activity of pectase in some apple varieties.
A.R. Long Ashton agric. hort. Res. Stat. 1948, 1949, pp. 228-34, bibl. 10.
e POLLARD, A.
Notes on apple juice* production in Switzerland and France.
A.R. Long Ashton agric. hort. Res. Stat. 1948, 1949, pp. 222-7.

* For latest work on juice production see cover p. iii for T.C. 21, just out.

NOTES ON BOOKS AND REPORTS.

Books and reports.

458. BRÜNE, F.
Die Praxis der Moor- und Heidekultur.
(The cultivation of fen and moorland soils.)
Verlag P. Parey, Berlin and Hamburg, 1948, pp. 258, bibl. 73.

The author, for many years Director of the Staatl. Moor-Versuchsstation [German moorland research station], Bremen, presents a critical review of the results obtained in the experimental cultivation of moor

soils, the emphasis being on the practical aspect. Naturally, the problems dealt with are largely those of the farmer, but a discussion of horticulture based on J. A. Werth's book* is also included. Late spring and early autumn frosts as well as high winds (shelter belts; species for planting suggested) are the main difficulties a gardener has to contend with. Lowland moor soils are suitable for vegetable varieties with a short growing season, while rhododendron, azalea and

* *Der Gartenbau auf den verschiedenen Moorarten* (Horticulture on different moor soils). P. Parey, Berlin, 1931.

related ornamentals do well on acid high moors. Glass culture of vegetables is recommended, where the climatic conditions are favourable, but commercial fruit growing is discouraged. *Potatoes* should be planted after the middle of May at a distance of 60 cm. between the rows and of 25-30 cm. in the rows. Earthing up has no advantage except to prevent greening of some high-lying tubers in the autumn, but the operation must not be carried out when a night frost is expected. Potatoes grown on lowland moors are excellent as seed though they are of poor table quality, while high moor soils yield tubers of good table quality. Both potatoes and horticultural crops require shallow cultivation.

459. CHILDS, H.

A plan of economic development for Sierra Leone.

Govt Printer, Sierra Leone, 1949, pp. 56, 2s. 6d.

A section is devoted to plans for increased agricultural production for export, and targets for 1954 are compared with tonnages exported in 1948. Among the principal crops in order of value are palm kernels and palm oil, kola, cocoa, piassava (raphia), ginger and coffee. For oil-palms comparative estimated yields of oils and kernels are tabulated for four improved varieties and three native varieties.

460. COX, J. F., AND JACKSON, L. E.

Crop management and soil conservation.

John Wiley, New York, \$3.80, and Chapman & Hall, 31s., Lond., 1948, pp. 572, illus.

This book is dedicated to "the future farmers of America" and is written for their instruction. The authors and editors have attained their primary object, which they state as being "to present in a simple way the major operations that will enable the grower to grow and market his crops successfully". The first half of the book consists of chapters on general aspects of good farming in America, and care is taken to stress the importance of soil conservation practices. Part II deals with the principal agricultural crops of America, chapter by chapter. The whole is very readable and is generously illustrated with photographs depicting aspects of farm life in the U.S.A. D.W.P.G.

461. F.A.O.

Fibres.

Bull. F.A.O. *Commod. Ser.* 14, 1949, pp. 118, 50 cents.

World production, import and area figures for 1934-38 and 1947 and 1948 are given for the major fibres, which include silk, hemp, jute and hard fibres (abaca, sisal and henequen) as well as cotton, wool and flax.

462. HYAMS, E.

The grape vine in England.

The Bodley Head, London, 1949, pp. 208, bibl. 42, illus., 16s.

What a boon occasionally to come across a book written not for the student "swotting" for his exams nor for the rightly earnest-minded advisory officer, but just simply by the enthusiast for the enthusiast. And thereby it is not suggested that Mr. Hyams is not practical, but his practice is that of the craftsman bent

on adding lustre and zest to an English countryside which tends to become ever more uniform and dull. He is a persuasive writer and his well-documented tales of the English vineyards from Roman times and those of the Venerable Bede in the eighth century to the end of the seventeenth century—when signs of decay were already apparent—and beyond, should dispel any mistaken ideas we may have of lack of sufficient sun in England. His tabulated comparisons of soil and climate show, in fact, that although the ripening months tend to be hotter in the French and German vine districts, the hardly less important pollination season is often brighter and more favourable in England. He is not alone in his view that the cause of decline in English vinegrowing lay not in climatic deterioration but rather in the fact that "the new rich had other fish to fry; profit, not amenity, was their purpose and there are more profitable crops than grapes. . . . Vines in England succeed with care, the care of the gardener rather than the farmer."

And lest the rheumatic twinges of an English winter may still sap our courage, he quotes the authority of Professor Siefert in the *Journal of Ecology* for September, 1948, for the suggestion that a new movement of desiccation has set in, so that the vineyards [of Europe] are again moving northwards.

So having got us in the right mood he proceeds to tell us how to choose and get our varieties, how to prune and propagate, how to cultivate and manure our vines and how to deal with the pests and diseases likely to thwart our laudable desires. That Mr. Hyams is up to date in his knowledge is indicated by his short, concise account of court noué, called by him "short joint disease", which has of late badly worried Continental vine growers.

Viticulturalist is a cumbersome word for vinegrower and it sticks in the gizzard of Mr. Hyams, so that he proposes, on the admittedly slender authority of an Englishman writing home from New York in 1616, the alternative of vinearon [vinearoon in the original]. The reviewer only hesitates to accept it because of uncertainty as to pronunciation. If we are to pronounce it like the French "vigneron" but without the g could we not spell it "vineron"? And if it is pronounced otherwise, well, how?

Is it too much to hope that the practical enthusiasm of such men as the author and Mr. Barrington Brock, to whose experiments at Oxted in Surrey a chapter is devoted [see also *H.A.*, 19: 2831, 3522], will inspire a long overdue revival in the cultivation of that most jocular gift of nature, the vine, and that in a few years' time instead of glooming in the uniform horrors depicted by Orwell in his grim novel "Nineteen Eighty-Four" we may be raising our glasses of vintage *Oxted blanc** 1960 to the great Dionysian revivalists, Hyams and Brock. And may the reviewer even go one step further and commend to the attention of East Malling Research Station the fact that such a happy event is looming, maybe imminent, and that now, if ever, is the chance to become the Montpellier of the North and eclipse the glories of Long Ashton cider with an even nobler, though not necessarily more potent, draught. And if the present Phylloxera regulations need changing, let them be changed carefully forthwith. D.A.

* See preface p. 7.

463. KESSLER, H.
Apfelsorten der Schweiz. (Swiss apple varieties.)
Buchverlag Verbandsdruckerei A. G., Bern,
2nd edition 1947, 139 loose leaves with 60
coloured illustrations. S. Fr. 10.
For review of this useful book see *H.A.*, 16: 1200.
The alterations in the 2nd edition are trivial.

464. KESSLER, H.
Birnensorten der Schweiz. (Swiss pear varieties.)
Buchverlag Verbandsdruckerei A. G., Bern,
1948, 130 loose leaves with 40 coloured
illustrations. S. Fr. 12.50.

The author, who is head of a department at the Wädenswil Research Station, is to be congratulated on the great success of this beautifully and clearly illustrated book on pear varieties. It follows the same scheme as that adopted by him for apples which results in an admirable clarity regarding the characteristics of the different pears described. Details are also given on time of ripening, possibilities for processing and general usefulness. Many of the varieties are known to English horticulturists.

465. KOBEL, F., AND SPRENG, H.
Neuzeitliche Obstbautechnik. (Modern fruit-growing methods.)
Buchverlag Verbandsdruckerei A. G., Bern,
1949, pp. 475, illus., 79 black and white and
15 coloured plates, 54 S. Fr.

This monumental tome, about 11×8×2 inches, is not for the pocket. And that really is all one can say against it.

The print is large and the illustrations leave nothing to be desired in clarity or descriptive power.

The whole business of fruit growing from planting to marketing and storage is described in very great detail by experts on the subject from German speaking Switzerland.

Prof. Kobel, author some years ago of the leading book of its time on the basis of fruit growing, i.e. *Lehrbuch des Obstbaus auf physiologischer Grundlage* [see *H.A.*, 1: 317], and now director of the Wädenswil research station, makes a very useful contribution on the same subject in the present work. He and Dr. Kessler, Chief Pomologist at Wädenswil, also deal with Swiss varieties. It is difficult to estimate what other chapters will be particularly interesting to fruit workers in the Commonwealth, but that on the Oeschberg pruning system commends itself, while that on pests and diseases and particularly on the materials recently discovered for their control strikes the reviewer as up-to-date, though the details of actual spray apparatus do not reveal any great novelties. Strawberries, raspberries, blackberries, red and black currants and gooseberries and, in a separate section, their pests and diseases are fully dealt with. Especially in the strawberry, virus diseases do not appear to be so dangerous as in England.

The chapter on manuring of top fruits is particularly interesting for the details given of fertilizer injection with the fertilizer lance, which affords a means of getting nutrient to the right place at the right time.

Considerable space is devoted to storage problems and

further to those of marketing and transporting fruit in bulk by train. Government regulations on the subject are given.

Spreng offers an interesting account of how the great Swiss Fruit Association, the Schweizerische Obstverband, works in conjunction with Federal and Cantonal authorities to improve every side of fruit production and utilization in the country.

Finally in two short but concise chapters the functions of the two famous research stations at Wädenswil and Lausanne are disclosed and the methods whereby the Government has encouraged and still encourages the prosperity of the industry by inspection, advice, loans and facilitation of full and proper use of fruit products are clearly set out.

No up-to-date horticultural library can afford to be without this book. D.A.

466. MISSION HORTICOLE, SERVICE DE L'HORTICULTURE, RABAT.
L'olivier au Maroc. (The olive in Morocco.)
Services de l'Horticulture, Rabat, Morocco,
1949, pp. 226, bibl. 24.

The olive is the commonest fruit tree in Morocco but its productive capacity, owing to neglect, faulty management and lack of selection, is comparatively negligible. The present authors—some dozen experts—offer a handbook which should form the basis of a rejuvenation of the olive industry in Morocco. They first briefly review the world oil situation, showing the extremely important positions held by the olive. They next consider the production of the olive growing countries before dealing with the situation in Morocco and how it can be improved. Thereafter they give details of all cultural operations necessary for the successful cultivation of the olive in Morocco. This is followed by directions for rejuvenation, chiefly by pruning. Further sections follow on choice of variety, pests and diseases, storage of olives and oil extraction. The book is usefully indexed and attractively illustrated and should prove valuable far beyond the confines of Morocco. [The chief articles in this are contained in a special number of *La Terre Marocaine* obtainable from Le Chef du Service de l'Horticulture, 65^{bis} Avenue de Témara, Rabat.]

467. QUARRELL, C. P.
Intensive salad production.
Crosby Lockwood & Son, London, 1949,
pp. 277, bibls. numerous, illus., 15s.

Great improvements have been made in this new, 4th, edition of a most valuable book [see *H.A.*, 16: 1699]. The section on Pests and Diseases is rewritten and expanded in accordance with recent discoveries, new developments have been included in the chapter on Cloches, and excellent new sections are devoted to the cultivation of watercress and melons. The author is not the first to include details of the John Innes composts in his book, and the inclusion is a useful one. The appendixes have been enlarged and modernized as to the data provided. In the section on soil warming the improvements recommended by the Electrical Research Association are noted. The documentation is admirable. It is essentially the book on English salad crop production.

468. RANSON, F.

British herbs.

Penguin Books, Harmondsworth, Middlesex,
1949, pp. 203, bibl. 14, illus., 16 plates,
1s. 6d.

The systematic collection of wild medicinal plants that was organized in Britain during the war, and the need to produce in English gardens herbs to replace the imported paper packets, aroused a wide interest in the subject of herbs and their uses. This book, written by one who for six years was county secretary of the Essex Herb Committee, will do much to satisfy, and more to stimulate, this interest. An introduction dealing with the history of herbs and herbalists, with the herb-gathering campaign launched during the war, is followed by one-page descriptions of the more common and valuable drug plants that grow wild in Britain. Information on habitat, uses and harvesting is delightfully supplemented with pieces of folklore and the etymology of plant names, and each page is illustrated with an accurate line drawing of the plant concerned. Some aids to identification are given, but the book is written for the layman and does not attempt to be a botanical flora. A special chapter entitled the Romance of the Rose culminates in "Operation Rose" and the large-scale production of the anti-scorbutic rose-hip syrup. The last part of the book deals with culinary herbs, their cultivation, drying and uses, including even some herb recipes. The individual garden herbs are described and illustrated in the same way as are the medicinal plants. Finally a few hints, both practical and imaginative, are offered on the planning and planting of a herb garden.

P.R.-D.

469. THOMPSON, C. R.

Good fruit farming.

English Universities Press Ltd., Lond., 1949,
pp. 296, illus., 4s. 6d.

This little book is amazing value for the money. It has been written primarily for students and newcomers to commercial fruit-growing and assumes no previous knowledge. The introduction draws attention to those operations that form the routine of fruit-growing and those that have to be done on special occasions only, thus ensuring a sound background for the detailed instruction that follows. The chapters, of which there are nine, cover site and soil, planning and planting, rootstocks, pollination, soil cultivations, nutrition, pruning, spraying systems, and pests and diseases and control measures. In addition a series of six appendixes deal with orchard renovation; propagation; harvesting, storage and marketing; tablet injection, costings and spray materials.

On the whole the book, which is remarkably up to date, achieves its object. It is sure to be widely read and should prove valuable even to experienced fruit-growers. Nevertheless one feels at times that Mr. Thompson is more at home with a pruning knife than with a pen and some parts require very careful reading. The chapter headings are not very helpful. Here and there throughout the book are statements that are bound to provoke argument amongst the pundits, such as the resistance of Florence cherry to bacterial canker (p. 60), that cherries are high worked to avoid scion rooting (p. 73), that the increase in length of stock stem

of M.II increases the risk of blowing over (p. 85) and that a spray machine with a 15 gallons per minute output is adequate to spray 60 acres of top fruit in five days (p. 202). Pruning, as one would expect from Mr. Thompson, is given most space, possibly to the detriment of other aspects, such as plum rootstocks, where the complexities of incompatibility are dismissed by reference to the behaviour of Oullins Golden Gage on Myrobalan B and Czar on Common Plum and Marianna.

The appendixes cover much useful ground, the one on costings being a valuable contribution to a rather neglected subject. That on propagation appears to be incomplete, lacking all reference to the production of rootstocks and their treatment up to the time of budding.

The illustrations are poor; simple line drawings without shading would have been more effective. A few printers' errors appear to have been overlooked, e.g. the caption "Bud Strip" (p. 268) for what is obviously "Bud Stick", and others. It is a book to buy, read and argue about.

H.B.S.M.

470. U.S. DEPARTMENT OF AGRICULTURE.

Trees. Yearbook of Agriculture 1949.

Superintendent of Documents, Washington,
D.C., pp. 944, \$2.00.

This is in the main and essentially for the forester, though the section on trees for the home, pp. 39-102, will be read with interest by a much wider public. In this section the shade trees most suitable for different parts of the U.S.A. are discussed and notes are given on planting problems and protection against diseases and pests.

471. WEST, T. F., AND CAMPBELL, G. A.

DDT, the synthetic insecticide.

Chapman & Hall, London, 1946, pp. 301,
illus., 21s.

Chapters 12, 13 and 14 (pp. 178 to 286) are of particular interest to horticulturists, as they are devoted to the use of DDT against plant pests, against miscellaneous pests, and its effect on beneficial insects. They are well documented.

472. RESEARCH BRANCH CENTRAL SECRETARIAT,
CARIBBEAN COMMISSION.*Yearbook of Caribbean research 1948.*
Survey of research and investigation in
Caribbean Commission territories.

Kent House, Port of Spain, Trinidad, 1949,
pp. 407.

Research work being undertaken on a wide range of subjects in the Caribbean territories of the U.S.A., the U.K., France and the Netherlands is here summarized, Part I, pp. 4-191, being devoted to Agriculture, Forestry, Fish and Wild Life. Among tropical tree and fruit crops receiving attention are avocados, bananas, cacao, cinchona, citrus, coconuts, coffee, mango, pineapple, rubber and vanilla. Work is also being undertaken on bamboos and derris and on a number of minor fruit crops and vegetables (cucumbers, pumpkins, pulses and tomatoes). A wide range of investigations concerns sugar-cane.

G.K.A.

473. CYPRUS DEPARTMENT OF AGRICULTURE (McDONALD, J.).
Annual Report of the Department of Agriculture Cyprus for the year 1948.
 Cyprus Govt Printing Office, Nicosia, 1949,
 pp. 11, 2s.

The report includes mention of the establishment of new deciduous fruit stations and olive nurseries and of experiments carried out on various horticultural crops, namely: deciduous fruits (variety trials), vines (manuring), olives (analysis of foliage, oil contents), potatoes (manuring). Leaf infection of fruit trees indicated deficiencies of Fe, Mn and Zn to be widespread, but their economic significance has not yet been determined. Analyses for oil content of the local olive variety "Ladolia" showed variation between trees ranging from 15.7 to 30.9% of fresh weight. G.K.A.

474. MARKLEY, K. S., JENKINS, D. W., AND CLAASSEN, C. E.
Oil-bearing palms.
Report of the F.A.O. Oilseed Mission for Venezuela. F.A.O., Washington, 1949, Part V, pp. 25-59, bibl. 32, illus.

The F.A.O. Mission was sent to Venezuela in 1948 to investigate the edible oil resources of that country. In a section devoted to oil palms they recommend extended planting of coconuts and African oil palm, *Elaeis guineensis*, and the planting on an experimental scale of the American oil palm *Corozo oleifera*, which apparently grows and yields well in localities where the African oil palm does not thrive. Tables are given showing the physical and chemical characteristics of the pulp and kernel oils of the two oil palms. In addition to these species the Mission found a wide range of oil bearing palms growing wild in Venezuela. Brief descriptions, together with tabulated information on physical and chemical characteristics of their oils, are given for *Scheelea macrolepis*, *S. humboldtiana*, *S. excelsa* (?), *S. macrocarpa*, *Jessenia bataua*, *J. repanda*, *Maximiliana caribaea*, *M. regia*, *M. elegans*, *M. macropetala*, *Acrocomia* spp., *Manicaria saccifera*, and *Macanilla* spp. Exploitation of these species, particularly those of the genus *Scheelea*, should at this stage be undertaken only on an experimental basis, but investigations and surveys should be continued to determine their possibilities for vegetable-oil production. The need for an efficient palm-nut cracking machine is noted. Other sections of the report are devoted to the fat-and-oil economy of Venezuela-cultivated oil-seed crops and processing facilities.

G.K.A.

475. FRANCE D'OUTRE-MER, OFFICE DE LA RECHERCHE SCIENTIFIQUE COLONIALE.
Rapport d'activité pour les années 1946-1947.
 (Report for 1946 and 1947.)
 22 rue Oudinot, Paris (VII)^e, 1948 ? [received 1949], pp. 157.

A description of the framework of State research in the French Colonies and of the functions of its Institutes in those Colonies and their liaison with France. Brief accounts are given of present activities in the following subjects:—soil science, plant biology, agricultural entomology and the control of termites, medical and veterinary entomology, plant chemistry, oceanography, and various other scientific and humane subjects.

Some 50 pages are devoted to government decrees and orders which concern the various schemes.

476. FREDERICTON.
Progress Report Fredericton Dominion Experimental Station, N.B., 1937-1947,
 1949, pp. 101.

Meteorological Records. Temperatures and precipitation including details of frost incidence are tabulated. *Horticulture* (pp. 51-79). Apple variety recommendations are made based on observations in the years 1937-1947, details of the 20 most promising being given. Pollination requirements as affecting the planting programme are noted. A proprietary naphthalene-acetic acid preparation has proved its value as a pre-harvest spray of apples. The search for good winter apples continues. Desirable late winter apples still remain few and far between. Double working trials for hardiness have included apple rootstocks Antonovka, Virginia Crab, Anaros, Hudson Seedling, Columbia, *Malus robusta*, *M. robusta* 5 and Hibernial and intermediate selected varieties of no commercial value but of extremely hardy wood. Manurial trials on apples showed that the result of overcrowding of trees cannot be overcome merely by manuring. Factors responsible for poor growth and yields include N and K deficiency, winter injury, shallowness of soil and high water-table due to poor drainage. In orchards under heavy sod, nitrogen was found most likely to be the limiting factor. Notes are given on strawberry and raspberry varieties. Trials are reported on sweet corn and tomatoes, on residual toxicity from borax. Breeding potatoes for resistance to late blight, generally using *Solanum demissum* in the original crosses, is producing many promising seedlings. Other aims of the potato breeder are resistance to common scab, to leaf roll and to aphids.

Cranberry studies were started in late 1941 at the Cumberland Point Illustration Station. In the cranberry bogs formed Early Black and Howes varieties were set and tested. In preparing one bog ammonium sulphamate was used to clear it of other vegetation. This method appears promising. Applications of white kerosene resulted in a kill of nearly all sedges and grasses in a cranberry bog.

477. GELDERMALSEN.
Verslag van de proeftuinen en proefsnemingen in het Rijkstuinbouwconsulentschap te Geldermalsen over het jaar 1948. (Report of the experimental gardens and experimental work of the State Horticultural Advisory Service, Geldermalsen, for the year 1948.) 1949, pp. 92.

This is the combined report of the activities of the horticultural advisory service of the Geldermalsen district of Holland, and of the experimental gardens at Gorinchem, Zaltbommel and Geldermalsen. The experimental work consists mainly of field trials with fruit, especially manurial, soil treatment and variety trials and experiments in pest and disease control. A little of the work is concerned with vegetables.

478. THOMAS, K. M. (INDIAN COFFEE BOARD).
First Annual Report of the Research Department of the Indian Coffee Board, 1947-48.
Bull. Res. Dep. Indian Coffee Bd, 1, 1949,
 pp. 38, 1s.

Research work undertaken at Balehonnur station, Mysore, and Chethalli station, Coorg, is outlined as follows:—*Breeding*: Controlled hybridization of *Ara-bica* clones with emphasis on resistance to leaf disease (*Hemileia vastatrix*) consistent with yield and quality, and of *Robusta* for yield. Yield records of selections of both species are tabulated, as are quality characters (% lights, triage, grades, etc.). *Vegetative propagation*: In experiments with soft wood *Robusta* cuttings the following results were obtained. (1) Cows' urine extract and phenylacetic acid increased the percentage of rooting in the open, whereas indolebutyric acid and Hortomone A did not. (2) Single noded cuttings rooted better than double noded cuttings set in the open during the monsoon. (3) Under thatch shade rooting was less than in (1) and (2), as was the effect of hormones, only cows' urine extract giving an appreciable improvement. (4) In a propagation chamber leafy cuttings rooted better than leafless. *Green manure crops*: 23 species are under trial. *Manurial experiments*: Results of 5 NPK experiments over 8 to 9 years are tabulated. In most years no significant responses were obtained. A bulky *versus* concentrated manures experiment has shown no response over 9 years. Negative results have also been obtained over 6 years with cattle manure and NPK alone and in combination, although there was an apparent depressing effect from the treatments. *Pruning*: Medium monsoon pruning over 3 years gave better leaf counts, but did not increase yields. Experiments comparing types of pruning and pruning in relation to spraying are also mentioned. *Control of leaf disease (Hemileia vastatrix)*: A comparison of bordeaux mixture in four strengths from 2-2-40 to 8-8-40 over two seasons showed no significant yield increases from the higher concentrations, though in February leaf counts they improved leaf survival. In a second experiment, however, 4-4-40 bordeaux gave better yields than 2-2-40 in two years out of three. Comparing pre-monsoon with post-monsoon spraying and spraying at both times, the two sprayings proved superior as to yield and leaf survival in most observations over 3 years. Addition of Tee-pol X spreader to bordeaux improved leaf retention, but the yield results were variable. Comparing 2-2-40 bordeaux with three strengths of Perenox, leaf counts have generally been similar, except in one season which favoured bordeaux. *White stem borer*: The time of emergence of the beetles is recorded. An experiment with DDT and BHC showed some protection from both insecticides. G.K.A.

479. MAINE.

Sixty-fifth Annual Report of Progress Year ending June 30, 1949, pp. 83, being Bull. 473.

Notes are given on many horticultural projects including:—*Apples*—pre-harvest sprays, manuring (there are indications of the value of a hay mulch), spray booms, incompatibility of hardy rootstocks, handling after harvest. *Beans*—breeding for resistance to halo blight, weed control. *Blueberries*—weed control, fruit fly, thrips, growing from seed, manuring, electric fencing against deer. *Potatoes*—weed control, Japanese millet as green manure, nitrogenous and other manuring, soil conditions affecting scab, irrigation, effect of thiourea on seed, vine killing, control of ring rot and

other diseases, deterioration in store, aphid control, development of a potato combine machine for digging and grading, storage.

480. CLIFTON, C. E., RAFFEL, S., AND BARKER, H. A. (Editors).

Annual Review of Microbiology.

Annual Reviews Inc., Stanford, Calif., 1949, pp. 476, bibl. numerous, \$6.

This review is drawn up along lines similar to those of Vol. II (*H.A.*, 19: 3525), and surveys recent work on special subjects. Chapters which may interest horticulturists and plant pathologists are those on "Constituents of viruses" (C. A. Knight), and "Nature and variability of disease resistance in plants" (H. Hart).

481. MISSISSIPPI.

Sixty-first Annual Report Mississippi Agricultural Experiment Station 1947-48, 1949, pp. 59.

Short notes are given on progress at the different centres of research. Those which chiefly concern horticulture are the Delta Branch Station embracing horticultural crops in general, the Mississippi Branch Station at Poplarville with its adjacent Tung Experimental Field, the Truck Crops Branch Station at Crystal Springs and the Coastal Plains Branch Station at Newton, where crops under study include fruits and vegetables. The work largely concerns the selection of varieties for particular purposes, e.g. quick freeze, etc., quality in sweet potatoes.

482. MUSHROOM RESEARCH ASSOCIATION LTD., YAXLEY.

Report of the Mushroom Research Station, Yaxley, Peterborough for the years 1946-48, 1949, pp. 71, bibls., illus., 10s.

This is the first report of the Mushroom Research Station to be published since its formation early in 1946, as for the first 3 years it was maintained as a private institution, and the findings of the station were the property of its members. Now that it is maintained by the government and public subscription, all work, past and future, is to be published. A brief account of the establishment, equipment and programme of the station is followed by reports from 3 sections. *Cropping experiments*. Eight factorial experiments are reported being mainly concerned with the making and use of synthetic composts and mushroom nutrition. Some of the conclusions drawn from these experiments will give an indication of their scope. (1) Ground limestone does not replace gypsum as a promoter of spawn growth. (2) Dried blood proved greatly superior to nitrochalk as a source of nitrogen. (3) Increasing the depth of the beds by 50% gave heavier mushrooms and a bigger crop per sq. ft., but shallow beds gave a heavier crop per ton of manure. (4) Beef extract increased the number and weight of mushrooms produced on compost filled at the third, fourth and fifth turn. (5) The difference in final yield between M.R.A. synthetic compost and mixtures of M.R.A. and horse manure compost mixed early in composting or at filling was not significant. Data on the growth rate of mushrooms, and the relationship between number and size of mushrooms are discussed. *Chemistry Department*. The methods adopted for sampling and analysis of

composts are described, and a few investigations made on the physical and chemical changes of composts during composting and cropping are summarized. *Microbiology Department*. The work is described under 5 headings: (1) Technique, (2) The composting process, (3) Mushroom growth, (4) Microbiology of mushroom beds, and (5) Diseases and competitors of the mushroom.

483. NEBRASKA.

Sixty-second Annual Report Nebraska Agricultural Experiment Station 1948, 1949, pp. 147.

The different sections in this report are clearly set out. Horticultural crops are dealt with on pp. 39-49. Projects concern food value of Nebraska grown vegetables, vegetable varietal trials, breeding of tomatoes and of potatoes, orchard irrigation, orchard spraying for scab, cedar apple rust, apple blotch, DDT residues, cherry leaf spot, use of Hibernial versus Virginia Crab as apple rootstocks, new intermediate stocks including some of the Malling range.

484. N.F.O. (NEDERLANDSE FRUITTELMERS ORGANISATIE).

Verslag van het Fruitteelt—Demonstratiebedrijf te Hoofddorp 1938-48. (Report of the Fruitgrowing Demonstration Trials at Hoofddorp, 1938-48.)

Publ. N.F.O., No. 9, [1949 ?], pp. 23, illus.

Preliminary results of these trials are published dealing with the first 11 years. The principal experiment is a soil treatment and cover crop trial with apple trees, the treatments consisting of (1) clean cultivation, (2) straw mulch, (3) leguminous cover crop during summer, ploughed in during winter, (4) grass sward. The first 3 treatments all resulted in much greater vigour and higher yields than the grass sward, especially during the early years. Straw mulching, however, led to serious deterioration of the lower layers of the soil. It is interesting to note that the total number of hours of work required in the grass orchards was one-third to one-half that required in the cultivated orchards. Other investigations include studies of the hedge and cordon systems of apple growing, planting distances for pears on quince and seedling stocks, and apple and pear variety trials.

485. NEW ZEALAND DIVISION OF HORTICULTURE (GREIG, A. M. W.).

Report of the Horticulture Division, N. Zealand, Department of Agriculture. A.R. N.Z. Dep. Agric. for 1948-49, 1949, pp. 95-111.

Statements are made on fruit production in districts for both deciduous and citrus and other sub-tropical fruits, i.e. Chinese gooseberries, tree tomatoes, passion fruit and feijoa. The approximate areas under different vegetables are noted. The area under hops in 1948 [almost entirely Waimea County, Nelson Province] was 750 acres with a yield of 986,835 lb. Tobacco continues to expand. It is restricted to Nelson Province, where in 1948 it covered 4,361 acres. Grape vines were grown on 890 acres in 1948. Work is reported from the berry fruit research station at Levin.

486. D.S.I.R., N.Z.

Twenty-third Annual Report of the Department of Scientific and Industrial Research, New Zealand, 1949, Wellington, pp. 88, 1s. 9d.

This consists largely of separate reports from different branches or individual institutes.

Entomology Division. Observations on codling moth are recorded. Work proceeds on possibility of controlling the green vegetable bug [*Nezara viridula*] by an egg parasite.

Fruit Research Station. A new branch known as the Fruit Research Station has now been formed to take over from the Plant Diseases Division the investigation of fruit problems other than those of disease. Its present headquarters are at the Plant Diseases Division in Auckland, with outlying research orchards at Oratia, Havelock Bay, Appleby and Earnsclough. A plot of 24 acres has been bought in Havelock North for development as future headquarters. The new series of East Malling woolly-aphis resistant apple rootstocks has been received. Trials of rootstocks for peaches, plums and apricots are being established. In tests of hormones for checking fruit drop in apples all preparations containing 2,4-D damaged foliage. A note is made of the continuance of frost investigation work. Green crinkle of apple, thought to be a virus, is under investigation. Storage tests showed that Chinese gooseberries could be stored for 6 weeks at 31° to 32° F. without damage. Trials of effect of manuring on apples confirmed previous ones and showed in general that the applications of N only resulted in deterioration of storage quality but that N, P and K applications resulted in the same storage quality as no manuring. An acetylene-operated bird scarer was tested and appeared promising. *Plant Diseases Division*. Notes are given on many diseases including:—tomato viruses, lettuce mosaic, strawberry crinkle and June yellows, hop mosaic, plum mosaic, apple mosaic, tomato leaf mould, *Verticillium* wilt, *Fusarium* wilt of water-melons, red core of strawberry, fireblight, stem blight of pea, crown gall. The disease control by therapeutants is being tested of grape mealybug, red mite of apples, leaf rolling caterpillars, woolly aphis, brown rot of peach and tomato late blight.

Hop Research. Though a suitable area for a research station has not yet been bought, work is in progress and includes the introduction of new varieties from Wye, England, and of other varieties from Tasmania as well as hop drying experiments at Wellington. Work on diseases is in progress at the Cawthron Institute.

Tobacco Research. Work has included sterilization of seed beds, fertilizer treatment, diseases including mosaic, *Verticillium* wilt, black root rot (*Thielaviopsis*) and collar rot (*Sclerotinia*). Varietal tests continue and breeding and seed production forms part of the work. Soil maps of certain tobacco areas are being published. *Cawthron Institute* (pp. 71-9). Among subjects under investigation are the following:—control of St. John's Wort by *Chrysolina hyperici*, control of magnesium deficiency in apples; control of zinc deficiency in stone-fruit by zinc sulphate sprays; copper deficiency in apples; raspberry dieback, possibly connected with boron deficiency; raspberry manurial trials including

effects of boron, magnesium, manganese, zinc and copper; deficiency symptoms in apples; apple rootstocks; "dieback" of apples; pear scab; colorimetric estimation of zinc in plant material; zinc content of apple leaves and fruit spurs; tobacco soil analysis; disinfecting tomato soils; value of compost in glass-house; nitrogenous manuring of tomatoes; time of planting tomatoes; "hard core" of tomatoes and the amelioration thereof. [Fuller accounts of the Cawthron investigations are given in the separately issued annual report of the Institute for 1948/49.]

487. NIGERIA AGRICULTURAL DEPARTMENT.

Annual Report Nigeria Agricultural, Department for the year 1947, being *Sessional Paper No. 12*, of 1949, Crown Agents for the Colonies, Millbank, London, 1949, pp. 83, 9d.

This consists of 6 separate reports dealing respectively with the Northern, Eastern and Western Provinces [3], specialist research sections, the Agricultural Schools and Produce Inspection. *Northern Province*. Tobacco quality unsatisfactory. The Date Plantation at Fika has started to bear. Citrus expansion awaits irrigation facilities. *Western Provinces*. The cocoa survey nears completion. Black pod disease in cocoa increased. Swollen shoot disease control continues. *Eastern Provinces*. The oil palm research continues at Benin. Cinchona research is damped down. *Specialist Sections*. Propagation work with improved clones of cocoa is in progress. Differences in swollen shoot strains are noted. The citrus rootstocks under trial at Moor Plantation have now been fruiting 13 years and are showing results. A brief report is given of operations at the oil palm station at Benin including trials of transplanting methods.

488. OVERSEAS FOOD CORPORATION.

First report of the Scientific Department, Overseas Food Corporation, crop season 1947-1948, 1949, H.M.S.O., Lond., pp. 56, 3s. 6d.

Almost wholly devoted to preparations for groundnuts. Alternate crops studied include safflower, castor oil and sweet potatoes, but the studies with these particular crops do not appear to have gone very far.

489. SCOTTISH SOCIETY FOR RESEARCH IN PLANT-BREEDING.

Report Scottish Society for Research in Plant-Breeding by the Directors and Report by the Director of Research to the Annual General Meeting, July 1949, Corstorphine, Edinburgh, pp. 54.

Breeding potatoes for resistance to blight, for field immunity to mosaics, and for resistance to leaf-roll continues. Tests suggest that some degree of resistance to eelworm may be present in some of the S. American species. The nature and cause of bolting in potatoes are being investigated in co-operation with the John Innes Institution.

490. SEYCHELLES.

Annual Report of the Department of Agriculture, Colony of Seychelles, for 1948, Mahé 1949, pp. 19.

Notes are given on the essential oils industry embracing cinnamon leaf oil and patchouli oil and on the vanilla industry. Laboratory investigations concern cinnamon bark oil, coconut oil, papain, banana flour. Methoxone is being tested against weeds.

491. ST. VINCENT AGRICULTURAL DEPARTMENT.

Annual Report on the Agricultural Department, St. Vincent, 1948, 1949, pp. 25.

Includes notes of production work in different districts and of mainly varietal trials at Camden Park Experiment Station with numerous crops including arrowroot, sweet potatoes, yams, tomatoes, and sugar-cane. Oranges, grapefruits and mangoes were grown and distributed.

492. SUGAR RESEARCH FOUNDATION (HOCKETT, R. C.).

Research in review.

Sixth report, Sugar Res. Foundation, N. York, 1949, pp. 43, bibl. extensive.

Fifty-two research projects, in process or completed, mainly in U.S. Universities, are outlined, and where work has been completed the findings are very briefly summarized. The field covered has ranged into dentistry, pharmacy, biology, nutrition, physiology, botany and organic chemistry, and includes both cane and beet sugar and sugar by-products, as well as the effects of sugar on the preservation of other products such as frozen fruits. Extensive lists of references are appended to the notes on many of the projects. G.K.A.

493. TUNISIE, SERVICE BOTANIQUE ET AGRONOMIQUE [S.B.A.T.].

Rapport sur les travaux de recherche effectués en 1948. (Report on investigations in Tunis in 1948.)

Bull. 15 Rens. Rech. Tunis., 1949, pp. 87.

Reports of the 10 Laboratories or Divisions of the S.B.A.T. and of the 4 Laboratories of the École Coloniale d'Agriculture de Tunis [E.C.A.T.]. *Vegetable Laboratory*. Selection of tomatoes, especially of Canatella and of introduced early varieties, continues. Tobacco selection is also in progress and the effects of hormonal sprays on fruit production in eggplant, tomato and peppers are being examined. *Fruit Laboratory*. Introduction of new apricots and hybridization work are reported. Attempts, so far not entirely successful, to produce the pistache from cuttings are reported. Grafting experiments were also made with pistache, unsuccessful on *Pistacia terebinthus* but fairly successful on local pistache trees. The method used with the latter is described. *Technical Laboratory* [E.C.A.T.]. Work reported on storage and extraction of olives. *Botanical Laboratory* [E.C.A.T.]. Report made on wine characters of 26 vines.

Noted.

494.

The following also have been examined:

- a A.R. Basutoland Dep. Agric. for 1947-48, pp. 34.

- b *A.R. Bermuda Dep. Agric. for 1948, 1949*, pp. 34.
- c *A.R. British Honduras Dep. Agric. for 1948*, pp. [unnumbered] 23.
- d CAWTHRON.
Annual Report Cawthron Institute, New Zealand, 1948-49, Nelson, 1949, pp. 50.
An abbreviated report of activities is included in the report of the D.S.I.R. for New Zealand [*q.v.*, Abstr. 486].
- e *60th A.R. Miss. agric. Exp. Stat. 1946-47*, 1948, pp. 60.
- f *A.R. National Research Council of Canada, 1948-49*, being *N.R.C. 1961*, 1949, pp. 35 English, 36 French.
- g *A.R. agric. Res. Inst. N. Ireland, Hillsborough, for 1948-49*, 1949, pp. 41.
- h *A.R. Northern Rhodesia Dep. Agric. for 1948*, 1949, Lusaka, pp. 15.
- i *A.R. Swaziland Dep. Native Land Settlement for 1948*, pp. 8.
- j *Rapport sur les travaux de recherche effectués en 1947, du Service Botanique et Agronomique de Tunisie*, 1948, pp. 68.

